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corrections to pages

PF dh	PF dh
.969	.948
1.072	1.017
.971	.950
.984	1.007
1.007	1.097
1.000	1.000
Helena (p.103)	Glasgow (p.40)

PF dh	PF dh
.964	.948
1.029	1.059
.979	.950
1.000	.990
1.034	1.077
1.000	1.000
Kalispell (p.124)	Great Fall (p.61)

PF dh
.960
1.048
.936
.993
1.079
1.000
Hayre (p.82)



MONTANA

WEATHER

DATA

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INTRODUCTION

MONTANA WEATHER DATA is a handbook on Montana weather. The weather data has been compiled for the daily recording of the National Climatological Center for three locations. The data is compiled for a five year span of time and five year averages determined therefrom. The years covered are 1974 thru 1978. The data is grouped by city and the cities are arranged alphabetically.

The material contained in this Montana Weather Data manual is designed specifically for use with the instruction manual The Technical Assistance Audit - Estimating Energy Usage and will flow into the charts and procedures presented therein. The data includes the following.

TABLE NO. 1 - MONTHLY TEMPERATURE
Typical monthly summary of weather data.

TABLE NO. 1B - DEGREE HOUR TABLE
Five-year average degree hours for heating and cooling along with the hours of occurrence.

TABLE NO. 5 - MONTHLY EXTREME TEMPERATURE
The warmest and coldest day of each month for 5 years, with temperatures given in increments of three hours.

TABLE NO. 5A - FIVE YEAR AVERAGE OF EXTREME TEMPERATURE
The five year average of the warmest and coldest day of each month, with temperatures given in increments of three hours.

TABLE NO. 5B - AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS
Average monthly temperatures given in 3 hour increments with 24 hour averages. Average monthly temperature for the hours of 19 thru 04, 07 thru 16, 19 thru 07, and 10 thru 16.

TABLE NO. 5C-1 - AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH
Average monthly temperature for each of 5 years and 5 year averages for hours of 19 thru 04 and 07 thru 16.

TABLE NO. 5C-2 - AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH
Average monthly temperature for each of 5 years and 5 year averages for hours of 19 thru 07 and 10 thru 16.

TABLE NO. 5C-3 - AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS
BY THE MONTH - PROPORTION FACTORS FOR DEGREE HOURS (PH_{dh})
Average monthly temperature by the month for 5 years with 5 year monthly averages and year averages. Proportion factors are computed for prorating degree hours to a specific year.

TABLE NO. 5D-1 - MONTHLY WET BULB TEMPERATURE
Typical monthly chart giving number of hours of various wet bulb temperatures for dry bulb temperatures above 78°. Monthly total hours of wet bulb occurrence and weight average wet bulb temperature for dry bulb temperatures above 78°.

TABLE NO. 5D-2 - WET BULB TEMPERATURES FIVE YEAR WEIGHTED AVERAGE
BY THE MONTH
The hours of occurrence and the weighted average wet bulb temperature by the month, with yearly total hours of occurrence and the yearly weighted average wet bulb temperature for dry bulb temperatures above 78°. Five year average hours of occurrence by the month, five year weight average wet bulb temperature by the month, five year average hours of occurrence, and five year weighted average wet bulb temperature for dry bulb temperatures above 78°.

TABLE NO. 6 - PERCENT OF SUNSHINE
Percent of sunshine is compiled by the month for 5 years with 5 year monthly, yearly and 5 year average given.

TABLE NO. 7 - AVAILABILITY OF SOLAR ENERGY
Flat Plate Collector-Single Glazed

TABLE NO. 7A - AVAILABILITY OF SOLAR ENERGY
Flat Plate Collector-Double Glazed

TABLE NO. 8 - AVAILABILITY OF SOLAR ENERGY
Concentrating Collector

In addition to the above tables which are compiled for all locations, a series of Tables No. 4 are included.

TABLE NO. 4A-3 - AVERAGE TEMPERATURE DIFFERENCE FOR
ESTIMATING ANNUAL ENERGY USE (ROOFS)

TABLE NO. 4B-3 - AVERAGE TEMPERATURE DIFFERENCE FOR
ESTIMATING ANNUAL ENERGY USE (WALLS)

TABLE NO. 4C-3 - DIRECT SOLAR AND DIFFUSED SKY RADIATION
FOR GLASS

TABLE NO. 4C-4 - SHADING COEFFICIENTS AND "U" VALUES FOR
GLASS



DEFINITIONS

The following are definitions of terms as used in this Handbook of weather data.

DEGREE HOUR: A temperature differential of one degree for a time span of one hour.

DIRECT SOLAR & DIFFUSE SKY RADIATION: Heat gain in btu per hour per square of masonry opening for single common window glass resulting from the direct solar and diffuse sky radiation.

DRY BULB TEMPERATURE: The measurement of the intensity of heat with a standard dry bulb thermometer.

MEAN TEMPERATURE: Middle of the five degree range.

NUMBER OF DEGREE HOURS ABOVE OR BELOW: The summation of all one degree temperature increments for a time span of one hour above or below the stated temperature.

NUMBER OF HOURS ABOVE: The number of hours during the year when the temperature is above the stated temperature. There are 8760 hours in the year.

NUMBER OF HOURS BELOW: The number of hours during the year when the temperature is below the stated temperature. There are 8760 hours in the year.

HOURS OF OCCURRENCE: The number of hours during the year that the stated temperature occurred.

TEMPERATURE RANGE: A five degree temperature range for example -1° thru -5° and 0° thru 4° the mean temperature being $-2\frac{1}{2}^{\circ}$ and $+2\frac{1}{2}^{\circ}$.

THREE HOUR INCREMENT: Temperatures are recorded every three hours, usually 1:00, 4:00, 7:00 and 10:00 AM and 1:00, 4:00, 7:00 and 10:00 PM. The temperature recorded is assumed to be the average temperature for a three hour time span with the time of recording at the center of the three hour increment.

TOTAL EQUIVALENT TEMPERATURE DIFFERENTIAL: The temperature difference between the outer and inner surface of a wall or roof resulting from direct solar radiation and transmission.

WET BULB TEMPERATURE: Temperature recorded by a wet bulb thermometer when moisture is rapidly evaporated from the wicking around the thermometer bulb.

BILLINGS WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded at Billings recording station.

TABLE NO. 1

LOCATION		BILLINGS, MONTANA										YEAR 1975		MONTH June		TEMPERATURE RECORD													
D	A	Hours Per Day of at Temperature - 5° Increment																											
		Y	-7½	-2½	2½		12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½	02½	07			
1													6		6		6	6											
2														3	3	3	3	3	3	6									
3															6	12		6											
4														3	3	6	6	6											
5																6	3	3	9	3									
6																9	6	6	3										
7																12	3	3	6										
8													9	15															
9													6	9	6	3													
10													3	3	6		6	6											
11													3		3	3	3	3	3	6									
12															6		6	3	3	6									
13															6	6	6	3	3										
14															6	3	6	9											
15															3	15	6												
16														6	3	6	3	6											
17														6	9	3	6												
18														3	21														
19															9	6	3	6											
20															6	3	3	9	3										
21															3	3	6	3	9										
22																3	6	3	3	6	3								
23														3	3		6		6		6								
24																3	6	3		3	3	6							
25																9	6	3	3	3									
26															3	3	6	6	6										
27															6	6	3		3	6									
28														3	3	3	6	3	3	3									
29															3	6	6	3	6										
30																6	3	3	3	3	6								
31																													
Tot													27	63	123	144	129	105	66	42	15	6							

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E T U R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	12.0	2.4		8765.5	581,742.0
-19			4.8	1.2	8763.1	572,982.5
-18			7.2	4.8	8760.7	564,223.0
-17			9.6	10.8	8758.3	555,463.5
-16			12.0	19.2	8755.9	546,704.0
-15	-15 thru -11 -12½	22.8	16.6	30.0	8753.5	537,944.5
-14			21.2	53.4	8748.9	529,202.6
-13			25.8	76.8	8744.3	520,460.7
-12			30.4	100.2	8739.7	511,718.8
-11			35.0	123.6	8735.1	502,976.9
-10	-10 thru -6 -7½	70.8	49.2	147.0	8730.5	494,235.0
-9			63.4	217.4	8716.3	485,540.1
-8			77.6	287.8	8702.1	476,845.2
-7			91.8	358.2	8687.9	468,150.3
-6			106.0	428.6	8673.7	459,455.4
-5	- 5 thru -1 -2½	91.8	124.4	499.0	8659.5	450,760.5
-4			142.8	650.9	8641.1	442,147.1
-3			161.2	802.8	8622.7	433,533.7
-2			179.6	954.7	8604.3	424,920.3
-1			198.0	1,106.6	8585.9	416,306.9
0	0 thru 4 2½	174.6	232.9	1,258.5	8567.5	407,693.5
1			267.8	1,543.8	8532.6	399,213.2
2			302.7	1,829.1	8497.7	390,732.9
3			337.6	2,114.4	8462.8	382,252.6
4			372.5	2,399.7	8427.9	373,772.3
5	5 thru 9 7½	159.0	404.3	2,685.0	8393.0	365,292.0
6			436.1	4,157.0	8361.2	356,978.5
7			467.9	4,629.0	8339.4	348,665.0
8			499.7	5,101.0	8297.6	340,351.5
9			531.5	5,573.0	8265.8	332,038.0
10	10 thru 14 12½	213.6	574.2	6,045.0	8234.0	323,724.5
11			616.9	6,683.3	8191.3	315,597.2
12			659.6	7,321.6	8148.6	307,469.9
13			702.3	7,959.9	8105.9	299,342.6
14			745.0	8,598.2	8063.2	291,215.3
15	15 thru 19 17½	211.2	787.2	9,236.5	8020.5	283,088.0
16			829.4	10,087.1	7978.3	275,172.9
17			871.6	10,937.7	7936.1	267,257.8
18			913.8	11,788.3	7893.9	259,342.7
19			956.0	12,638.9	7851.7	251,427.6
20	20 thru 24 22½	376.2	1031.2	13,489.5	7809.5	243,512.5
21			1106.4	14,633.6	7734.3	235,890.9
22			1181.6	15,777.7	7659.1	228,269.3
23			1256.8	16,921.8	7583.9	220,647.7
24			1332.0	18,065.9	7508.7	213,026.1
25	25 thru 29 27½	505.8	1433.2	19,210.0	7433.5	205,404.5
26			1534.4	20,794.9	7332.3	198,224.1
27			1635.6	22,379.8	7231.1	191,043.7
28			1736.8	23,964.7	7129.9	183,863.3
29			1838.0	25,549.6	7028.7	176,682.9
30	30 thru 34 32½	709.8	1980.0	27,134.5	6927.5	169,502.5
31			2122.0	29,327.4	6785.5	162,930.1
32			2264.0	31,520.3	6643.5	156,357.7
33			2406.0	33,713.2	6501.5	149,785.3
34			2548.0	35,906.1	6359.5	143,212.9
35	35 thru 39 37½	760.2	2700.0	38,099.0	6217.5	136,640.5
36			2852.0	41,027.1	6065.5	130,802.9
37			3004.0	43,955.2	5913.5	124,965.3
38			3156.0	46,883.3	5761.5	119,127.7
39			3308.0	49,811.4	5609.5	113,290.1

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	780.0	3464.0	52,739.5	5457.5	107,452.5
41			3620.0	56,437.5	5301.5	102,385.0
42			3776.0	60,135.5	5145.5	97,317.5
43			3932.0	63,833.5	4989.5	92,250.0
44			4088.0	67,531.5	4833.5	87,182.5
45	45 thru 49 47½	746.4	4237.3	71,229.5	4677.5	82,115.0
46			4386.6	75,690.7	4528.2	77,810.8
47			4535.9	80,151.9	4378.9	73,506.6
48			4685.2	84,613.1	4229.6	69,202.4
49			4834.5	89,074.3	4080.3	64,898.2
50	50 thru 54 52½	772.8	4989.1	93,535.5	3931.0	60,594.0
51			5143.7	98,756.4	3776.4	57,049.6
52			5298.3	103,977.3	3621.8	53,505.2
53			5452.9	109,198.2	3467.2	49,960.8
54			5607.5	114,419.1	3312.6	46,416.4
55	55 thru 59 57½	714.0	5750.3	119,640.0	3158.0	42,872.0
56			5893.1	125,604.5	3015.2	40,071.0
57			6035.9	131,569.0	2872.4	37,270.0
58			6178.7	137,533.5	2729.6	34,469.0
59			6321.5	143,498.0	2586.8	31,668.0
60	60 thru 64 62½	704.4	6462.4	149,462.5	2444.0	28,867.0
61			6603.3	156,136.2	2303.1	26,775.3
62			6744.2	162,809.9	2162.2	24,683.6
63			6885.1	169,483.6	2021.3	22,591.9
64			7026.0	176,157.3	1880.4	20,500.2
65	65 thru 69 67½	510.6	7128.1	182,831.0	1739.5	18,408.5
66			7230.2	190,112.3	1637.4	16,924.2
67			7332.3	197,393.6	1535.3	15,439.9
68			7434.4	204,674.9	1433.2	13,955.6
69			7536.5	211,956.2	1331.1	12,471.3
70	70 thru 74 72½	451.8	7626.9	219,237.5	1229.0	10,987.0
71			7717.3	226,999.9	1138.6	9,984.1
72			7807.7	234,762.3	1048.2	8,981.2
73			7898.1	242,524.7	957.8	7,978.3
74			7988.5	250,287.1	867.4	6,975.4
75	75 thru 79 77½	301.8	8048.9	258,049.5	777.0	5,972.5
76			8109.3	266,188.9	716.6	5,346.6
77			8169.7	274,328.3	656.2	4,720.7
78			8230.1	282,467.7	595.8	4,094.8
79			8290.5	290,607.1	535.4	3,468.9
80	80 thru 84 82½	246.6	8339.8	298,746.5	475.0	2,843.0
81			8389.1	307,160.3	425.7	2,491.2
82			8438.4	315,574.1	376.4	2,139.4
83			8487.7	323,987.9	327.1	1,787.6
84			8537.0	332,401.7	277.8	1,435.8
85	85 thru 89 87½	141.6	8565.3	340,815.5	228.5	1,084.0
86			8593.6	349,423.3	200.2	926.2
87			8621.9	358,031.1	171.9	768.4
88			8650.2	366,638.9	143.6	610.6
89			8678.5	375,246.7	115.3	452.8
90	90 thru 94 92½	71.4	8692.8	383,854.5	87.0	295.0
91			8707.1	392,568.7	72.7	243.8
92			8721.4	401,282.9	58.4	192.6
93			8735.7	409,997.1	44.1	141.4
94			8750.0	418,711.3	29.8	90.2
95	95 thru 99 97½	15.6	8753.1	427,425.5	15.5	39.0
96			8756.2	436,183.3	12.4	25.0
97			8759.3	444,941.1	9.3	14.0
98			8762.4	453,698.9	6.2	6.2
99			8765.5	462,456.7	3.1	1.6

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: BILLINGS, MONTANAYEAR: 1974

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	16	51	57	51	55	57	58	51	47	
Feb.	26	41	39	39	50	56	54	47	41	
Mar.	17	55	47	48	62	64	54	45	38	
Apr.	25	56	50	58	74	83	82	72	65	
May	26	56	54	59	73	77	72	66	63	
June	25	70	62	72	84	92	95	85	80	
July	15	74	65	79	90	97	98	87	77	
Aug.	6	65	64	70	84	95	88	72	64	
Sept.	25	53	59	63	76	85	87	73	69	
Oct.	2	46	45	54	72	81	78	70	60	
Nov.	21	48	47	49	58	57	52	52	47	
Dec.	9	36	32	33	35	50	42	37	31	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	-13	-16	-16	-11	02	01	-04	-03	
Feb.	1	10	14	21	35	39	39	37	36	
Mar.	23	11	10	09	15	24	28	21	20	
Apr.	3	28	28	32	38	36	34	31	32	
May	13	38	39	41	42	35	35	33	33	
June	1	42	39	47	57	68	70	63	55	
July	3	50	51	59	68	74	76	71	63	
Aug.	20	55	54	54	49	50	52	49	49	
Sept.	27	37	33	34	42	47	48	44	46	
Oct.	6	27	24	28	44	54	55	48	46	
Nov.	29	15	14	14	25	34	26	18	20	
Dec.	24	03	00	04	12	20	17	16	18	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: BILLINGS, MONTANA

YEAR: 1975

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	23	39	40	37	44	49	44	44	39	
Feb.	24	33	34	33	43	40	35	31	28	
Mar.	16	36	36	33	46	52	55	45	38	
Apr.	22	41	42	45	60	60	60	50	51	
May	15	56	51	61	77	83	84	77	65	
June	24	62	55	64	77	86	86	80	68	
July	27	73	64	68	83	97	97	90	82	
Aug.	6	70	63	70	83	92	96	86	80	
Sept.	15	56	52	59	75	87	84	74	71	
Oct.	3	52	47	49	68	84	82	71	70	
Nov.	5	50	47	50	64	67	62	58	51	
Dec.	4	43	42	42	53	58	58	51	47	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	31	-08	-11	-09	-04	09	09	02	00	
Feb.	4	-05	-06	-07	-07	-06	-07	-07	-07	
Mar.	27	11	14	15	16	16	14	13	14	
Apr.	1	17	17	15	18	21	24	21	18	
May	1	33	31	39	48	52	50	45	42	
June	8	49	46	43	45	43	46	45	44	
July	31	60	54	61	66	72	70	60	58	
Aug.	17	50	48	52	58	70	67	59	58	
Sept.	20	40	38	40	52	62	62	50	45	
Oct.	24	29	24	22	29	37	34	30	26	
Nov.	29	01	-02	-05	-04	03	-03	-01	-01	
Dec.	17	-03	-08	01	08	14	14	15	18	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: BILLINGS, MONTANA

YEAR: 1976

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	29	42	41	38	51	57	50	42	37	
Feb.	23	39	43	43	48	59	59	44	44	
Mar.	31	39	36	45	60	66	67	57	57	
Apr.	12	49	42	47	65	76	76	69	63	
May	13	48	44	54	72	81	80	72	68	
June	30	53	53	65	77	88	89	84	74	
July	24	70	63	77	90	102	92	84	70	
Aug.	22	66	58	66	83	96	97	90	78	
Sept.	2	72	70	74	91	91	87	71	63	
Oct.	1	50	48	51	66	81	79	70	63	
Nov.	4	44	41	45	58	66	59	54	50	
Dec.	16	41	41	41	49	56	52	50	49	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	7	-09	-09	-10	-10	-09	-11	-12	-11	
Feb.	5	00	01	-05	01	05	04	02	00	
Mar.	3	-10	-11	-10	-04	03	04	04	04	
Apr.	3	26	25	24	33	46	53	46	41	
May	2	35	31	36	45	55	56	47	39	
June	14	45	43	44	44	50	56	50	51	
July	28	54	52	59	75	85	87	76	69	
Aug.	27	46	46	52	66	74	76	67	63	
Sept.	27	37	34	36	40	61	60	54	48	
Oct.	24	22	24	23	37	49	49	38	34	
Nov.	27	-03	01	05	13	18	16	14	14	
Dec.	31	12	14	13	12	13	12	09	03	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: BILLINGS, MONTANA

YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	18	22	34	36	41	41	41	42	34	
Feb.	21	47	44	43	58	63	58	48	43	
Mar.	23	35	32	44	58	70	67	59	55	
Apr.	26	45	41	50	71	81	80	65	58	
May	31	50	47	57	76	84	83	75	62	
June	25	71	66	73	88	95	92	87	74	
July	17	79	76	82	97	98	94	81	72	
Aug.	24	65	60	71	85	90	87	77	74	
Sept.	7	61	60	65	78	87	88	80	67	
Oct.	16	55	56	52	70	75	70	53	51	
Nov.	11	37	33	38	52	65	57	57	51	
Dec.	3	27	31	43	45	46	47	45	43	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	8	-03	-06	-06	-08	-01	-02	-02	02	
Feb.	25	24	23	21	34	39	35	29	28	
Mar.	20	18	15	13	19	29	34	29	24	
Apr.	3	22	20	21	34	42	42	39	40	
May	18	37	36	35	37	38	39	38	39	
June	11	49	48	53	60	68	69	64	58	
July	11	54	50	62	71	77	77	72	66	
Aug.	11	53	48	54	71	83	84	73	67	
Sept.	24	42	42	41	50	58	50	48	46	
Oct.	11	29	29	32	44	52	53	45	45	
Nov.	21	-15	-17	-18	-04	-01	01	03	04	
Dec.	8	-13	-14	-16	-15	-15	-15	-15	-16	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: BILLINGS, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	5	05	09	26	34	40	39	40	39	
Feb.	23	32	33	34	38	40	40	38	38	
Mar.	30	52	49	49	71	78	74	65	56	
Apr.	26	54	51	50	62	70	56	51	51	
May	15	61	60	65	80	88	88	80	61	
June	29	68	66	66	83	90	81	74	70	
July	24	65	74	71	82	93	91	82	77	
Aug.	6	67	63	70	84	92	94	81	73	
Sept.	4	67	62	63	82	96	88	78	76	
Oct.	10	51	52	51	69	77	72	63	55	
Nov.	2	44	40	40	55	68	63	58	48	
Dec.	24	31	30	31	39	40	37	30	25	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	31	02	02	-01	-01	-01	-03	-06	-06	
Feb.	1	-08	-06	-05	-03	-01	-06	-06	-05	
Mar.	3	-08	-10	-10	-06	-02	-02	-08	-10	
Apr.	20	31	29	34	49	60	58	52	50	
May	5	38	38	40	43	43	44	41	41	
June	1	44	44	44	54	55	58	53	47	
July	20	53	53	53	54	57	56	57	55	
Aug.	17	48	48	53	64	69	60	56	48	
Sept.	18	45	44	41	39	36	34	36	37	
Oct.	31	27	25	26	43	55	52	43	44	
Nov.	21	-09	-09	-10	-03	01	00	-01	00	
Dec.	30	-18	-20	-19	-13	-03	-05	-12	-13	

TABLE NO. 5A

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: BILLINGS, MONTANAYEAR: AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.		31.8	36.2	37.6	45.0	48.8	46.4	43.8	39.2	
Feb.		38.4	38.6	38.4	47.4	48.0	49.2	41.6	38.8	
Mar.		43.4	40.0	43.8	59.4	66.0	63.4	54.2	48.8	
Apr.		49.0	45.2	50.0	66.4	74.0	70.8	61.4	57.6	
May		54.2	51.2	59.2	75.6	82.6	81.4	74.0	63.8	
June		64.8	60.4	68.0	81.8	90.2	88.6	82.0	73.2	
July		72.2	68.4	75.4	88.4	97.4	94.4	84.8	75.6	
Aug.		66.6	61.6	69.4	83.8	93.0	92.4	81.2	73.8	
Sept.		61.8	60.6	64.8	80.4	89.2	86.8	75.2	69.2	
Oct.		50.8	49.6	51.4	69.0	79.6	76.2	65.4	59.8	
Nov.		44.6	41.0	44.4	57.4	64.6	58.6	55.8	49.4	
Dec.		35.6	35.2	38.0	44.2	50.0	47.2	42.6	39.0	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.		-6.2	-8	- 8.4	-6.8	0.0	-1.2	- 4.4	- 3.6	
Feb.		4.2	5.2	5.0	12.0	15.2	13.0	11.0	10.4	
Mar.		4.4	3.6	3.4	8.0	14.0	15.6	11.8	10.4	
Apr.		24.8	23.8	25.2	34.4	41.0	42.2	37.8	36.2	
May		36.2	35.0	38.2	43.0	44.6	44.8	40.8	38.8	
June		45.8	44.0	46.2	52.0	56.8	59.8	55.0	51.0	
July		24.2	52.0	58.8	66.8	73.0	73.2	67.2	62.2	
Aug.		50.4	48.8	53.0	61.6	69.2	67.8	60.8	57.0	
Sept.		40.2	38.2	38.4	44.6	52.8	50.8	46.4	44.4	
Oct.		26.8	25.2	26.2	39.4	49.4	48.6	40.8	39.0	
Nov.		-2.2	2.6	-2.8	5.4	11.0	8.0	6.6	7.4	
Dec.		-3.8	5.6	-3.4	0.8	5.8	4.6	2.6	2.0	

TABLE NO. 5 - B

LOCATION BILLINGS, MONTANA YEAR 1974

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	21	32	32	41	44	57	66	58	49	44	33	27	42.0
04	21	31	29	39	42	54	62	54	45	42	33	26	39.8
07	21	30	30	42	47	62	69	57	48	43	33	26	42.3
10	22	37	37	52	54	72	80	68	59	54	39	31	47.3
13	26	42	42	56	58	78	86	74	67	62	44	37	56.0
16	26	43	43	56	57	79	86	75	67	59	41	33	51.8
19	23	37	36	49	52	70	78	67	59	52	37	30	49.2
22	22	35	33	45	47	64	71	61	53	47	35	28	45.1
Ave 01 - 22	22.6	35.8	35.8	47.7	50.5	66.9	75.0	64.8	56.0	50.5	37.4	29.9	44.8
Ave 19 - 04	21.8	33.8	32.5	43.5	46.2	61.2	69.2	60.0	51.5	46.2	34.5	27.8	44.0
Ave 07 - 16	23.8	38.0	38.0	51.5	54.0	72.8	80.2	68.5	60.2	54.5	39.2	31.8	49.4
Ave 19 - 07	21.6	33.0	32.0	43.2	46.4	61.4	69.2	59.4	50.8	45.6	34.2	27.4	43.7
Ave 10 - 16	24.7	40.7	40.3	54.7	56.3	76.3	84.0	72.3	64.3	58.3	41.3	33.7	51.7

TABLE NO. 5 - B

LOCATION BILLINGS, MONTANA YEAR 1975

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	22	15	26	32	45	52	65	60	51	43	29	28	39.0
04	21	14	26	31	43	51	62	56	48	41	27	27	37.2
07	21	14	26	33	48	58	68	60	50	42	28	27	39.6
10	25	18	32	39	55	65	79	71	64	50	35	30	46.9
13	29	22	36	44	58	69	85	78	72	56	40	33	51.8
16	27	22	36	43	59	68	84	78	71	54	36	32	50.8
19	24	19	30	38	52	62	76	69	61	49	32	30	45.2
22	22	18	27	35	49	57	70	64	57	45	31	29	42.0
Ave 01 - 22	23.6	18.1	30.2	37.1	51.3	60.2	74.5	67.8	59.5	47.9	32.9	29.4	44.4
Ave 19 - 04	22.2	16.5	27.2	34.0	47.2	55.5	68.2	62.2	54.2	44.5	29.8	28.5	40.8
Ave 07 - 16	25.5	19.0	32.5	39.8	55.0	65.0	79.0	71.8	64.2	50.5	34.8	30.5	47.3
Ave 19 - 07	22.0	16.0	27.0	33.8	47.4	56.0	68.2	61.8	53.4	44.0	29.4	28.2	40.6
Ave 10 - 16	27.0	20.7	34.7	42.0	57.3	67.3	82.7	75.7	69.0	53.3	37.0	31.7	49.8

TABLE NO. 5 - B

LOCATION BILLINGS, MONTANA YEAR 1976

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	24	29	27	40	48	52	64	62	55	40	32	29	41.8
04	24	28	25	37	46	51	59	59	51	38	30	28	39.7
07	24	27	27	40	52	58	68	64	54	38	29	27	42.3
10	28	34	35	49	61	65	79	75	66	49	38	32	50.9
13	32	39	40	55	66	69	86	82	73	56	43	37	56.5
16	29	36	40	54	66	69	85	81	73	54	40	34	55.1
19	26	32	33	47	59	62	77	72	64	47	35	31	48.8
22	26	30	30	43	53	57	69	67	58	44	33	30	45.0
Ave 01 - 22	26.5	32.9	32.0	46.1	56.2	60.9	73.7	71.1	62.0	46.0	35.2	31.5	47.8
Ave 19 - 04	25.0	29.8	28.8	41.8	51.5	55.5	67.2	65.0	57.0	42.2	32.5	29.5	43.8
Ave 07 - 16	28.2	34.0	35.5	49.5	61.3	65.3	79.5	75.5	64.3	49.2	37.5	32.5	51.2
Ave 19 - 07	24.8	29.2	28.4	41.4	51.6	56.0	67.4	64.8	56.4	41.4	31.8	29.0	43.5
Ave 10 - 16	29.7	36.3	38.3	52.7	64.3	67.7	83.3	79.3	70.7	53.0	40.3	34.3	54.2

TABLE NO. 5 - B

LOCATION BILLINGS, MONTANA YEAR 1977

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	17	33	30	41	49	60	63	58	53	44	28	19	41.2
04	17	32	29	40	46	57	60	55	49	42	28	19	39.5
07	16	31	30	43	52	65	67	60	51	43	27	19	42.0
10	20	39	39	55	62	75	77	71	61	54	34	22	50.8
13	23	46	44	61	66	80	83	76	69	59	39	24	55.8
16	21	44	43	61	65	79	83	74	69	57	34	22	54.3
19	17	37	36	53	58	72	75	66	61	50	31	20	48.0
22	17	35	32	47	52	65	68	62	57	46	29	19	44.1
Ave 01 - 22	18.0	37.6	36.0	50.3	56.6	69.2	72.6	66.1	59.0	49.7	31.8	20.3	47.3
Ave 19 - 04	17.0	34.2	31.8	45.2	51.2	63.5	66.5	60.2	55.0	45.5	29.0	19.2	43.2
Ave 07 - 16	20.0	40.0	39.0	55.0	61.2	74.8	77.5	70.2	62.5	53.2	33.5	21.8	50.7
Ave 19 - 07	16.8	33.6	31.4	44.8	51.4	63.8	66.6	60.2	54.2	45.0	28.6	19.2	43.0
Ave 10 - 16	21.3	43.0	42.0	59.0	64.3	78.0	81.0	73.7	66.3	56.7	35.7	22.7	53.6

TABLE NO. 5 - B

LOCATION BILLINGS, MONTANA YEAR 1978

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	9	14	30	41	48	55	60	59	54	43	22	15	37.5
04	8	13	28	38	46	52	57	55	51	41	21	15	35.4
07	8	13	30	41	50	59	63	60	53	42	21	14	37.8
10	12	17	38	50	58	70	71	72	64	54	26	17	45.8
13	14	20	42	54	61	74	78	79	70	59	30	19	50.0
16	13	20	42	54	60	73	77	77	70	57	27	18	49.0
19	12	18	36	47	55	66	70	70	62	50	24	16	43.8
22	10	16	32	43	50	60	64	64	58	46	23	15	40.1
Ave 01 - 22	11.0	16.0	34.8	46.6	53.6	64.0	68.0	67.4	60.6	49.1	24.6	16.1	42.6
Ave 19 - 04	9.8	15.2	31.5	42.2	49.8	58.2	62.8	62.0	56.2	45.0	22.5	15.2	39.2
Ave 07 - 16	11.8	17.5	38.0	49.8	57.2	69.0	72.2	72.0	64.2	53.0	26.0	17.0	45.6
Ave 19 - 07	9.4	14.8	31.2	42.0	49.8	58.4	62.8	61.6	55.6	44.4	22.2	15.0	38.9
Ave 10 - 16	13.0	19.0	40.7	52.7	59.7	72.3	75.3	76.0	68.0	56.7	27.7	18.0	48.3

TABLE NO. 5 - B

LOCATION _____ YEAR _____

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01													
04													
07													
10													
13													
16													
19													
22													
Ave 01 - 22													
Ave 19 - 04													
Ave 07 - 16													
Ave 19 - 07													
Ave 10 - 16													

TABLE NO. 5 - C - 1							LOCATION <u>BILLINGS, MONTANA</u>							
							FIVE YEARS <u>1974-1978</u>							
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 04	1974	21.8	33.8	32.5	43.5	46.2	61.2	69.2	60.0	51.5	46.2	34.5	27.8	44.0
	1975	22.2	16.5	27.2	34.0	47.2	55.5	68.2	62.2	54.2	44.5	29.8	28.5	40.8
	1976	25.0	29.8	28.8	41.8	51.5	55.5	67.2	65.0	57.0	42.2	32.5	29.5	43.8
	1977	17.0	34.2	31.8	45.2	51.2	63.5	66.5	60.2	55.0	45.5	29.0	19.2	43.2
	1978	9.8	15.2	31.5	42.2	49.8	58.2	62.8	62.0	56.2	45.0	22.5	15.2	39.2
5-Yr. Ave		19.2	25.9	30.4	41.3	49.2	58.8	66.8	61.9	54.8	44.7	29.7	24.0	42.2
Day 07 - 16	1974	23.8	38.0	38.0	51.5	54.0	72.8	80.2	68.5	60.2	54.5	39.2	31.8	49.4
	1975	25.5	19.0	32.5	39.8	55.0	65.0	79.0	71.8	64.2	50.5	34.8	30.5	47.3
	1976	28.2	34.0	35.5	49.5	61.3	65.3	79.5	75.5	64.3	49.2	37.5	32.5	51.2
	1977	20.0	40.0	39.0	55.0	61.2	74.8	77.5	70.2	62.5	53.2	33.5	21.8	50.7
	1978	11.8	17.5	38.0	49.8	57.2	69.0	72.2	72.0	64.2	53.0	26.0	17.0	45.6
5-Yr. Ave		21.9	29.7	36.6	49.1	57.7	69.4	77.7	71.6	63.1	52.1	34.2	26.7	48.8
Day/Night Dif.		2.7	3.8	6.2	7.8	8.5	10.6	10.9	9.7	8.3	7.4	4.5	2.7	6.6

TABLE NO. 5 - C - 2														LOCATION BILLINGS, MONTANA									
														FIVE YEARS 1974-1978									
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH																							
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave									
Night 19 - 07	1974	21.6	33.0	32.0	43.2	46.4	61.4	69.2	59.4	50.8	45.6	34.2	27.4	43.7									
	1975	22.0	16.0	27.0	33.8	47.4	56.0	68.2	61.8	53.4	44.0	29.4	28.2	40.6									
	1976	24.8	29.2	28.4	41.4	51.6	56.0	67.4	64.8	56.4	41.4	31.8	29.0	43.5									
	1977	16.8	33.6	31.4	44.8	51.4	63.8	66.6	60.2	54.2	45.0	28.6	19.2	43.0									
	1978	9.4	14.8	31.2	42.0	49.8	58.4	62.8	61.6	55.6	44.4	22.2	15.0	38.9									
5-Yr. Ave		18.9	25.3	30.0	41.0	49.3	59.1	66.8	61.6	54.1	44.1	29.2	23.8	41.9									
Day 10 - 16	1974	24.7	40.7	40.3	54.7	56.3	76.3	84.0	72.3	64.3	58.3	41.3	33.7	51.7									
	1975	27.0	20.7	34.7	42.0	57.3	67.3	82.7	75.7	69.0	53.3	37.0	31.7	49.8									
	1976	29.7	36.3	38.3	52.7	64.3	67.7	83.3	79.3	70.7	53.0	40.3	34.3	54.2									
	1977	21.3	43.0	42.0	59.0	64.3	78.0	81.0	73.7	66.3	56.7	35.7	22.7	53.6									
	1978	13.0	19.0	40.7	52.7	59.7	72.3	75.3	76.0	68.0	56.7	27.7	18.0	48.3									
5-Yr. Ave		23.1	31.9	39.2	52.2	60.4	72.3	81.3	75.4	67.7	55.6	36.4	28.1	51.5									
Day/Night Dif.		4.2	6.6	9.2	11.2	11.1	13.2	14.5	13.8	13.6	11.5	7.2	4.3	9.6									

TABLE NO. 5 - C - 3

LOCATION BILLINGS, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	22.6	35.8	35.8	47.7	50.5	66.9	75.0	64.8	56.0	50.5	37.4	29.9	44.8	1.013
1975	23.6	18.1	30.2	37.1	51.3	60.2	74.5	67.8	59.5	47.9	32.9	29.4	44.4	1.022
1976	26.5	32.9	32.0	46.1	56.2	60.9	73.7	71.1	62.0	46.0	35.2	31.5	47.8	.950
1977	18.0	37.6	36.0	50.3	56.6	69.2	72.6	66.1	59.0	49.7	31.8	20.3	47.3	.960
1978	11.0	16.0	34.8	46.6	53.6	64.0	68.0	67.4	60.6	49.1	24.6	16.1	42.6	1.066
5-Yr. Ave.	20.3	28.1	33.8	45.6	53.6	64.2	72.8	67.4	59.4	48.6	32.4	25.4	45.4	1.002

MONTHLY WET BULB TEMPERATURE

LOCATION BILLINGS, MONTANA MONTH July, 1976 INTERIOR DESIGN CONDITIONS 78 °db 65 °wb

wb	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb
T	1	2	3	4	5	6	7	8 [✓]	9 [✓]	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	T	
60																																60	
61																																61	
62																																62	
63																																63	
64																																64	
65	6		3	3		3		3		3	6						3						3							3	36	65	
66						3		3		3								6					3	3							18	66	
67				3		3				3																						9	67
68							6		6		9																					21	68
69																							3									3	69
70																																	70
71																																	71
72																																	72
73																																	73
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89																																	89
90																																	90
91																																	91
92																																	92
93																																	93
Total Hours of Occurrence and Weight Average Wet Bulb Temperature for Month																																87	66.3

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summarized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH												
LOCATION BILLINGS, MONTANA YEAR 1974-1978												
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May												
Ju	51	65.9	3	65.0	12	66.3	18	65.3	36	65.8	24.0	65.8
Jul	93	66.2	141	67.3	87	66.3	39	65.8	30	65.6	78.0	66.5
Aug			9	65.3	6	65.0					3.0	65.2
Sep							3	65.0	15	66.2	3.6	66.0
Oct												
Nov												
Dec												
TOTAL	144.0	66.1	153	67.1	105	66.2	60	65.6	81.0	65.8	108.6	66.3
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

TABLE NO. 6 Location <u>BILLINGS, MONTANA</u>						
PERCENT OF SUNSHINE - MONTHLY AVERAGE						
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	39	47	46	35	31	39.6
Feb.	60	59	50	64	50	56.6
Mar.	59	66	65	69	80	67.8
Apr.	64	64	60	81	59	65.6
May	50	53	77	69	47	59.2
Jun.	78	61	60	70	70	67.8
Jul.	79	76	82	70	62	73.8
Aug.	72	78	76	69	73	73.6
Sept.	74	84	77	65	61	72.2
Oct.	70	52	63	64	71	64.0
Nov.	46	45	55	43	42	46.2
Dec.	39	43	40	33	31	37.2
Yearly	60.8	60.7	62.6	61.0	56.4	60.3

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

BILLINGS, MONTANA		45° N.L. P= 1.05		Single Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	264	6	26.6	47	23,079
Feb	269	7	32.3	54	28,471
Mar	272	7	37.4	62	36,595
Apr	254	7	50.2	59	31,471
May	234	7	60.1	61	30,975
Jun	225	7	68.2	65	30,713
Jul	230	7	78.7	78	38,930
Aug	245	7	77	76	40,405
Sep	260	7	65.1	68	37,128
Oct	257	7	55.2	62	34,577
Nov	231	7	40.4	46	22,315
Dec	248	5	31.3	45	17,298

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

BILLINGS, MONTANA		45° N.L. P= 1.05		Double Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	250	6	26.6	47	21,855
Feb	255	7	32.3	54	26,989
Mar	258	7	37.4	62	34,711
Apr	241	7	50.2	59	29,860
May	222	7	60.1	61	29,386
Jun	213	7	68.2	65	29,075
Jul	218	7	78.7	78	36,899
Aug	232	7	77	76	38,261
Sep	247	7	65.1	68	35,272
Oct	244	7	55.2	62	32,828
Nov	219	7	40.4	46	21,155
Dec	235	5	31.3	43	16,391

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

<div> <div>BILLINGS, MONTANA</div> <div> 45° N.L. P= 1.05 </div> </div>						
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	249	7	26.6	47	819	25,396
Feb	278	9	32.3	54	1351	37,830
Mar	295	9	37.4	62	1646	51,029
Apr	270	11	50.2	59	1752	52,669
May	257	11	60.1	61	1721	53,459
Jun	248	11	68.2	65	1773	53,196
Jul	249	11	78.7	78	2136	66,229
Aug	261	10	77.0	76	1984	61,492
Sep	275	9	65.1	68	1683	50,490
Oct	277	7	55.2	62	1202	37,268
Nov	244	7	40.4	46	786	23,570
Dec	245	5	31.3	45	551	17,089
AV MO						<u>44,135</u>

GLASGOW WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded at Glasgow recording station.

TABLE NO. 1

LOCATION				GLASGOW, MONTANA				YEAR		1974		MONTH		December		TEMPERATURE RECORD													
D A	Hours Per Day of Given Temperature - 5° Increment																												
	Y	-7½	-2½	2½	7½	12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½	02½	07½				
1						6	6	3	3	3																			
2						3	9	9																					
3							9	6	6	3																			
4								6	9	6	3																		
5								3	12	3	3			3															
6							9	6	3	3		3																	
7					9	9	6																						
8					6	3		3	3	6	3																		
9								3	9	6	3	3																	
10									6	12	3	3																	
11							6	3	15																				
12						3	3	12	6																				
13								24																					
14					6		12	6																					
15					12	6	6																						
16					3	6	9	6																					
17							9	3	6	6																			
18							6	9	9																				
19					3		3	12	6																				
20				3	3	6	12																						
21						3	3	3	3	9	3																		
22					3	3	12		6																				
23				3	15	6																							
24		3	6		12	3																							
25						3	3	6	6	3	3																		
26						3	9	9	3																				
27							6	3	3	3	9																		
28						6	3	9	3	3																			
29					3	6	9	3	3																				
30							6	6	6	6																			
31					3	9	6	3	3																				
Tot		3	6	6	84	84	162	156	129	72	30	9	3																

DEGREE HOUR TABLE NO. 1B
5-Year Average 1974 - 1978

T E M P. E R E T U R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No.of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below	80.4	16.08		8760.00	546,708.0
-19			32.16	8.0	8743.92	537,988.2
-18			48.24	32.2	8727.84	529,268.4
-17			64.32	72.4	8711.76	520,548.6
-16			80.40	128.6	8695.68	511,828.8
-15	-15 thru -11	93	99.00	201.0	8679.60	503,109.0
-14			117.60	327.9	8661.00	494,475.9
-13			136.20	454.8	8642.40	485,842.8
-12			154.80	581.7	8623.80	477,209.7
-11			173.40	708.6	8605.20	468,576.6
-10	-10 thru -6	160.8	205.56	835.5	8586.60	459,943.5
- 9			237.72	1,089.3	8554.44	451,437.3
- 8			269.88	1,343.1	8522.28	442,931.1
- 7			302.04	1,596.9	8490.12	434,424.9
- 6			334.20	1,850.7	8457.96	425,918.7
- 5	- 5 thru -1	137.4	361.68	2,104.5	8425.80	417,412.5
- 4			389.16	2,507.4	8398.32	409,055.4
- 3			416.64	2,910.3	8370.84	400,698.1
- 2			444.12	3,313.2	8343.36	392,341.2
- 1			471.60	3,716.1	8315.88	383,984.1
0	0 thru 4	191.4	509.88	4,119.0	8288.40	375,627.0
1			548.16	4,686.3	8250.12	367,434.3
2			586.44	5,253.6	8211.84	359,241.6
3			624.72	5,820.9	8173.56	351,048.9
4			663.00	6,388.2	8135.28	342,856.2
5	5 thru 9	285	720.00	6,955.5	8097.00	334,663.5
6			777.00	7,761.0	8040.00	326,709.0
7			834.00	8,566.5	7983.00	318,754.5
8			891.00	9,372.0	7926.00	310,800.0
9			948.00	10,177.5	7869.00	302,845.5
10	10 thru 14	353.4	1018.68	10,983.0	7812.00	294,891.0
11			1089.36	12,107.7	7741.32	287,255.7
12			1160.04	13,232.4	7670.54	279,620.4
13			1230.72	14,357.1	7599.96	271,985.1
14			1301.40	15,481.8	7529.28	264,349.8
15	15 thru 19	328.2	1367.04	16,606.5	7458.60	256,714.5
16			1432.68	18,072.0	7392.96	249,420.0
17			1498.32	19,537.5	7327.32	242,125.5
18			1563.96	21,003.0	7261.68	234,831.0
19			1629.60	22,468.5	7196.04	227,536.5
20	20 thru 24	473.4	1724.28	23,934.0	7130.40	220,242.0
21			1818.96	25,800.3	7035.72	213,348.3
22			1913.64	27,666.6	6941.04	206,454.6
23			2008.32	29,532.9	6846.36	199,560.9
24			2103.00	31,399.2	6751.68	192,667.2
25	25 thru 29	487.8	2200.56	33,265.5	6657.00	185,773.5
26			2298.12	35,612.4	6559.44	179,360.4
27			2395.68	37,959.3	6461.88	172,947.3
28			2493.24	40,306.2	6364.32	166,534.2
29			2590.80	42,653.1	6266.76	160,121.1
30	30 thru 34	643.2	2719.44	45,000.0	6169.20	153,708.0
31			2848.08	47,912.4	6040.56	147,860.4
32			2976.72	50,824.8	5911.92	142,012.8
33			3105.36	53,737.2	5783.28	136,165.2
34			3234.00	56,649.6	5654.64	130,317.6
35	35 thru 39	635.4	3361.08	59,562.0	5526.00	124,470.0
36			3488.16	63,113.7	5398.92	119,261.7
37			3615.24	66,665.4	5271.84	114,053.4
38			3742.32	70,217.1	5144.76	108,845.1
39			3869.40	73,768.8	5017.68	103,636.8

DEGREE HOUR TABLE NO. 1B
5-Year Average 1974 - 1978

T E M P. E R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No.of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	609.6	3991.32	77,320.5	4890.60	98,428.5
41			4113.24	81,494.7	4768.68	93,842.7
42			4235.16	85,668.9	4646.76	89,256.9
43			4357.08	89,843.1	4524.84	84,671.1
44			4479.00	94,017.3	4402.92	80,085.3
45	45 thru 49 47½	606	4600.20	98,191.5	4281.00	75,499.5
46			4721.40	102,973.5	4159.80	71,521.5
47			4842.60	107,755.5	4038.60	67,543.5
48			4963.80	112,537.5	3917.40	63,565.5
49			5085.00	117,319.5	3796.20	59,587.5
50	50 thru 54 52½	711	5227.20	122,101.5	3675.00	55,609.5
51			5369.40	127,542.0	3532.80	52,290.0
52			5511.60	132,982.5	3390.60	48,970.5
53			5653.80	138,423.0	3248.40	45,651.0
54			5796.00	143,863.5	3106.20	42,331.5
55	55 thru 59 57½	666	5929.20	149,304.0	2964.00	39,012.0
56			6062.40	155,433.0	2830.80	36,381.0
57			6195.60	161,562.0	2697.60	33,750.0
58			6328.80	167,691.0	2564.40	31,119.0
59			6462.00	173,820.0	2431.20	28,488.0
60	60 thru 64 62½	637.8	6589.56	179,949.0	2298.00	25,857.0
61			6717.12	186,729.9	2170.44	23,877.9
62			6844.68	193,510.8	2042.88	21,898.8
63			6972.24	200,291.7	1915.32	19,919.7
64			6999.80	207,072.6	1787.76	17,940.6
65	65 thru 69 67½	573.6	7214.52	213,853.5	1660.20	15,961.5
66			7329.24	221,140.1	1545.48	14,588.1
67			7443.96	228,426.7	1430.76	13,214.7
68			7558.68	235,713.3	1316.04	11,841.3
69			7673.40	242,999.9	1201.32	10,467.9
70	70 thru 74 72½	402.6	7753.92	250,286.5	1086.60	9,094.5
71			7834.44	258,161.2	1006.08	8,209.2
72			7914.96	266,035.9	925.56	7,323.9
73			7995.48	273,910.6	845.04	6,438.6
74			8076.00	281,785.3	764.52	5,553.3
75	75 thru 79 77½	322.8	8140.56	289,660.0	684.00	4,668.0
76			8205.12	297,897.4	619.44	4,145.4
77			8269.68	306,134.8	554.88	3,622.8
78			8334.24	314,372.2	490.32	3,100.2
79			8398.80	322,609.6	425.76	2,577.6
80	80 thru 84 82½	197.4	8438.28	330,847.0	361.20	2,055.0
81			8477.76	339,336.5	321.72	1,792.5
82			8517.24	347,826.0	282.24	1,530.0
83			8556.72	356,315.5	242.76	1,267.5
84			8596.20	364,805.0	203.28	1,005.0
85	85 thru 89 87½	108	8617.80	373,294.5	163.80	742.5
86			8639.40	381,944.7	142.20	632.7
87			8661.00	390,594.9	120.60	522.9
88			8682.60	399,245.1	99.00	413.1
89			8704.20	407,895.3	77.40	303.3
90	90 thru 94 92½	45	8713.20	416,545.5	55.80	193.5
91			8722.20	425,272.2	46.80	160.2
92			8731.20	433,998.9	37.80	126.9
93			8740.20	442,725.6	28.80	93.6
94			8749.20	451,452.3	19.80	60.3
95	95 thru 99 97½	10.8	8751.36	460,179.0	10.80	27.0
96			8753.52	468,933.6	8.64	18.4
97			8755.68	477,688.2	6.48	9.7
98			8757.84	486,442.8	4.32	4.3
99			8760	495,197.4	2.16	1.1

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GLASGOW, MONTANAYEAR: 1974

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	15	02	06	14	26	42	45	45	48	
Feb.	26	32	31	34	43	45	40	37	36	
Mar.	17	37	34	41	53	56	48	27	23	
Apr.	25	55	54	61	77	85	86	73	67	
May	26	53	51	61	73	73	76	68	61	
June	20	71	71	85	89	95	91	82	65	
July	15	68	65	72	85	96	98	82	78	
Aug.	6	64	61	71	88	96	93	78	70	
Sept.	16	51	50	55	75	81	81	68	60	
Oct.	2	41	38	45	65	85	79	66	65	
Nov.	21	36	37	38	48	56	47	44	44	
Dec.	5	32	32	31	42	50	38	34	29	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	-27	-32	-31	-23	-21	-24	-27	-30	
Feb.	3	00	-01	-02	03	12	12	14	19	
Mar.	23	-01	-01	04	11	13	15	10	09	
Apr.	2	30	27	27	28	31	32	32	28	
May	14	35	33	44	50	52	52	46	41	
June	1	43	40	56	64	67	69	62	50	
July	3	54	52	63	72	77	76	67	61	
Aug.	31	46	42	48	61	62	59	50	43	
Sept.	29	37	31	33	38	43	43	34	31	
Oct.	6	22	21	29	43	53	52	42	37	
Nov.	28	19	12	09	18	22	16	10	09	
Dec.	24	01	-02	04	11	17	11	11	13	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GLASGOW, MONTANA

YEAR: 1975

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	23	25	24	23	35	45	42	41	40	
Feb.	23	23	26	29	41	48	43	34	35	
Mar.	18	29	26	38	53	56	54	44	45	
Apr.	23	42	41	44	53	64	62	50	47	
May	15	51	49	61	74	83	84	74	64	
June	25	70	65	76	82	88	89	76	69	
July	28	74	70	81	93	100	98	88	80	
Aug.	6	67	62	73	88	93	94	81	73	
Sept.	15	49	48	59	75	85	85	65	61	
Oct.	2	47	44	51	70	80	79	66	51	
Nov.	4	52	48	48	60	74	58	48	39	
Dec.	4	34	44	45	47	47	46	32	19	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	-15	-14	-12	-10	-08	-08	-07	-08	
Feb.	4	-08	-12	-16	-10	-06	-07	-11	-15	
Mar.	24	09	05	08	12	16	16	09	07	
Apr.	1	01	00	05	12	16	18	13	10	
May	1	32	37	36	44	49	43	44	36	
June	1	44	41	55	63	68	55	59	51	
July	31	62	62	63	61	65	63	58	52	
Aug.	26	46	42	52	65	70	74	63	59	
Sept.	30	35	34	39	50	56	57	42	46	
Oct.	24	24	24	27	38	45	39	34	34	
Nov.	30	-04	-09	-14	-05	02	00	02	07	
Dec.	17	-20	-22	-17	-08	-01	-01	-01	-02	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GLASGOW, MONTANA

YEAR: 1976

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	27	09	12	19	27	45	39	38	35	
Feb.	23	39	38	40	42	54	53	40	35	
Mar.	31	36	31	42	56	67	68	52	44	
Apr.	12	45	41	50	64	76	76	64	60	
May	28	54	52	67	82	87	86	65	60	
June	10	62	59	73	78	83	86	77	65	
July	26	57	57	73	84	90	91	79	75	
Aug.	22	64	59	73	88	98	99	84	80	
Sept.	5	56	55	68	81	93	94	74	67	
Oct.	2	52	51	55	71	75	75	63	60	
Nov.	17	28	27	25	46	55	59	56	60	
Dec.	26	14	16	17	23	41	44	41	40	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	7	-13	-12	-19	-16	-14	-17	-21	-26	
Feb.	4	-01	01	02	08	12	09	07	05	
Mar.	3	-12	-14	-13	-06	02	04	-08	-07	
Apr.	3	24	24	32	40	47	48	40	35	
May	2	27	22	36	44	50	52	41	36	
June	18	44	44	57	66	70	71	63	57	
July	15	52	49	58	64	70	70	68	56	
Aug.	28	47	44	55	69	78	80	67	65	
Sept.	27	32	31	37	54	62	63	46	43	
Oct.	21	23	17	23	38	45	42	35	30	
Nov.	28	-10	-11	-07	00	06	03	02	06	
Dec.	31	15	15	12	10	07	-01	-07	-12	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GLASGOW, MONTANA

YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	26	16	15	11	13	28	31	32	32	
Feb.	21	36	31	34	43	50	48	40	30	
Mar.	23	25	25	32	46	63	64	51	43	
Apr.	26	54	45	60	76	86	85	72	66	
May	10	66	62	67	84	89	90	77	63	
June	7	65	60	72	89	93	92	79	69	
July	22	74	70	76	85	94	95	86	76	
Aug.	24	52	52	62	78	92	92	74	65	
Sept.	7	54	53	54	67	80	80	70	65	
Oct.	12	36	34	39	56	70	67	54	48	
Nov.	12	36	33	32	50	57	47	38	31	
Dec.	12	27	35	32	36	37	33	27	27	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	28	-26	-29	-32	-24	-17	-19	-20	-21	
Feb.	1	01	01	01	05	11	15	14	14	
Mar.	20	09	09	13	26	34	36	30	23	
Apr.	3	14	08	14	23	30	32	34	37	
May	6	35	32	52	65	67	67	57	52	
June	13	49	48	50	52	56	61	56	54	
July	14	44	43	57	66	76	76	67	59	
Aug.	11	44	42	57	77	81	83	74	64	
Sept.	27	39	39	42	55	62	62	49	48	
Oct.	11	22	19	25	38	49	49	40	32	
Nov.	21	-07	-10	-11	02	05	03	-01	03	
Dec.	9	-36	-36	-35	-27	-22	-20	-19	-19	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GLASGOW, MONTANA

YEAR: 1978

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	24	12	14	22	26	28	14	-01	-06	
Feb.	23	22	17	20	26	36	35	33	31	
Mar.	30	40	40	45	58	67	67	56	50	
Apr.	26	46	42	53	61	69	66	58	55	
May	15	56	53	64	76	88	88	73	70	
June	9	61	57	66	76	85	73	71	62	
July	24	63	64	74	91	94	94	84	76	
Aug.	12	59	58	68	83	90	92	81	81	
Sept.	4	72	60	72	86	94	95	77	66	
Oct.	10	43	46	50	69	71	67	57	59	
Nov.	7	42	44	41	59	69	60	57	55	
Dec.	11	08	13	17	27	42	39	38	37	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	28	-17	-21	-22	-16	-09	-10	-13	-12	
Feb.	17	-16	-19	-18	-13	-05	-04	-09	-08	
Mar.	3	-16	-19	-19	-12	-06	-06	-13	-13	
Apr.	20	27	24	33	44	51	54	45	39	
May	4	35	36	43	55	55	55	46	44	
June	1	44	42	50	48	56	56	52	49	
July	9	46	44	58	65	68	70	62	58	
Aug.	2	46	41	50	56	61	63	56	47	
Sept.	18	44	45	46	44	44	43	39	39	
Oct.	22	27	24	28	40	48	44	40	40	
Nov.	19	-06	-07	-06	-02	00	-01	-03	-06	
Dec.	30	-24	-27	-23	-22	-19	-22	-28	-24	

TABLE NO. 1A
MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GLASGOW, MONTANA

YEAR: AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.		12.8	14.2	17.8	25.4	37.6	34.2	31	29.8	
Feb.		28.2	28.6	31.4	39	46.6	43.8	36.8	33.4	
Mar.		33.4	31.2	39.6	53.2	61.8	60.2	46	41	
Apr.		48.4	45	52.2	66.2	76	75	63.4	59	
May		56	53.4	64	77.8	84	84.8	71.4	63.6	
June		65.8	62.4	74.4	82.8	88.8	86.2	77	66	
July		67.2	65.2	75.2	87.6	94.8	95.2	83.8	77	
Aug.		61.2	58.4	69.4	85	93.8	94	79.6	73.8	
Sept.		56.4	53.2	61.6	76.8	86.6	87	70.8	63.8	
Oct.		43.8	42.6	48	66.2	76.2	73.4	61.2	56.6	
Nov.		38.8	37.8	35.8	53.2	62.2	54.2	48.6	45.8	
Dec.		24.8	28	28.4	35	43.4	40	34.4	30.4	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.		-19.6	-21.6	-23.2	-17.8	-13.8	-15.6	-17.6	-19.4	
Feb.		- 4.8	- 4.2	- 6.2	- 1.4	- 4.8	5	3	3	
Mar.		- 2.2	- 4	- 1.4	6.2	7.4	13	5.6	3.8	
Apr.		19.2	16.8	22.2	29.4	35	36.8	35.6	29.8	
May		32.8	32.6	42.2	51.6	54.6	53.8	46.8	41.8	
June		44.8	43	53.2	58.6	63.4	62.4	58.4	52.2	
July		51.6	50	59.8	65.6	71.2	71	64.4	57.2	
Aug.		45.8	42.2	52.4	65.6	70.4	71.8	62	55.6	
Sept.		37.4	36	38.8	48.2	53.4	53.6	42	41.4	
Oct.		23.6	21	26.4	39.4	48	45.2	38.2	34.6	
Nov.		- 1.6	- 5	- 5.8	2.6	7	3	2	3.8	
Dec.		-12.8	-14.4	-11.8	- 7.2	- 3.6	- 6.6	- 8.8	- 8.8	

TABLE NO. 5 - B <div> GLASGOW, LOCATION <u>MONTANA</u> YEAR <u>1974</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	8	22	25	39	44	56	64	56	47	41	28	22	37.7
04	7	22	23	37	42	54	61	53	45	39	27	21	35.9
07	7	21	25	44	50	65	71	61	50	42	27	21	40.3
10	12	27	31	53	56	73	79	69	61	55	36	27	48.3
13	16	32	37	57	58	77	84	72	66	62	42	33	53
16	12	29	36	57	57	78	84	73	65	58	36	28	51.1
19	10	26	29	47	51	69	75	65	55	48	32	25	44.3
22	10	24	27	42	46	61	68	59	50	44	30	24	40.4
Ave 01 - 22	10.4	25.5	29.6	47.5	50.7	66.2	73.3	64	55.4	49.2	33.2	25.1	43.9
Ave 19 - 04	8.8	23.5	26	41.3	45.8	60	67	58.3	49.3	43	29.3	23	39.6
Ave 07 - 16	11.8	27.3	32.3	52.8	55.3	73.3	79.5	68.8	60.5	54.3	35.3	27.3	48.2
Ave 19 - 07	8.4	23	25.8	41.8	46.6	61	67.8	58.8	49.4	42.8	28.8	22.6	39.7
Ave 10 - 16	13.3	29.3	34.7	55.7	57	76	82.3	71.3	64	58.3	38	29.3	50.8

TABLE NO. 5 - B <div> GLASGOW, LOCATION <u>MONTANA</u> YEAR <u>1975</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	16	9	20	31	45	53	64	57	47	38	26	16	35.2
04	15	7	18	30	44	52	62	53	45	37	25	15	33.6
07	14	7	20	34	51	62	71	61	52	39	25	15	37.6
10	21	14	28	39	58	69	80	70	62	48	34	20	45.3
13	27	19	33	42	60	72	84	75	68	53	39	24	49.7
16	23	19	32	42	59	71	84	75	67	51	33	21	48.1
19	20	14	24	37	53	64	75	66	56	44	29	19	41.8
22	17	12	21	34	49	57	67	60	51	40	27	17	37.7
Ave 01 - 22	18.5	12.6	24.7	35.9	52.8	62.4	73.1	64.9	56.3	45	30.1	18.5	41.1
Ave 19 - 04	17	10.5	20.8	33	47.8	56.5	67	59	49.8	39.8	26.8	16.8	37.1
Ave 07 - 16	21.3	14.8	28.3	39.3	57.5	68.5	79.8	70.3	62.3	47.8	32.8	20	45.2
Ave 19 - 07	16.4	9.8	20.6	33.2	48.4	57.6	67.8	59.4	50.2	39.6	26.4	16.4	37.2
Ave 10 - 16	23.7	17.3	31	41	59	70.7	82.7	73.3	65.7	50.7	35.3	21.7	47.7

TABLE NO. 5 - B				LOCATION		GLASGOW, MONTANA		YEAR 1976					
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	12	26	24	40	48	55	62	61	51	36	22	18	37.9
04	11	26	21	38	46	53	60	58	48	33	20	17	35.9
07	11	26	24	44	57	62	67	67	55	36	20	17	40.5
10	16	31	32	52	65	68	75	76	66	47	30	20	48.2
13	20	35	37	58	70	71	81	81	73	53	36	23	53.2
16	17	33	38	57	70	71	80	81	73	50	31	21	51.8
19	15	28	29	48	60	64	71	71	60	42	25	20	44.4
22	13	27	27	43	53	59	65	65	54	39	23	18	40.5
Ave 01 - 22	13.8	29.5	29.3	47.8	58.2	62.5	70.3	70	59.8	42.2	26.4	18.9	44.1
Ave 19 - 04	12.8	26.8	25.3	42.3	51.8	57.8	64.5	63.8	53.3	37.5	22.5	18.3	39.7
Ave 07 - 16	16	31.3	32.8	52.8	65.5	68	75.8	76.3	66.8	46.5	29.3	20.3	48.5
Ave 19 - 07	12.4	26.6	25	42.6	52.8	58.6	65	64.2	53.6	37.2	22	18	39.8
Ave 10 - 16	17.7	33	35.7	55.7	68.3	70	78.7	79.3	70.7	50	32.3	21.3	51.1

TABLE NO. 5 - B				LOCATION		GLASGOW, MONTANA		YEAR 1977					
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	2	24	27	39	50	57	60	54	49	39	21	8	35.8
04	2	22	25	35	48	56	57	51	47	37	19	8	33.9
07	0	22	28	45	56	64	66	59	51	39	19	7	38
10	4	28	38	57	65	71	75	67	58	50	28	10	45.9
13	8	33	43	63	68	75	80	71	64	56	32	13	50.5
16	6	32	42	62	69	75	80	71	64	52	28	10	49.3
19	4	27	33	51	61	68	72	63	56	43	24	8	42.5
22	3	26	30	45	55	61	64	57	52	40	22	7	38.5
Ave 01 - 22	3.1	26.5	33.6	48.2	58.3	65.7	69.1	61.2	55.2	46	24.5	8.3	41.8
Ave 19 - 04	2.8	24.8	28.8	42.5	53.5	60.5	63.3	56.3	51	39.8	21.5	7.8	37.7
Ave 07 - 16	4.5	28.8	37.8	56.8	64.5	71.3	75.3	67	59.3	49.3	26.8	10	46
Ave 19 - 07	2.2	24.2	28.6	43	54	61.2	63.8	56.8	51	39.6	21	7.6	37.8
Ave 10 - 16	6	31	41	60.7	67.3	73.7	78.3	69.7	62	52.7	29.3	11	48.6

TABLE NO. 5 - B				LOCATION				GLASGOW, MONTANA				YEAR 1978			
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	- 4	5	21	37	47	54	58	57	51	39	19	9	32.8		
04	- 4	4	20	36	46	52	56	54	48	37	18	7	31.2		
07	- 4	4	21	40	53	61	66	63	54	40	18	6	35.2		
10	0	8	27	47	60	69	73	73	64	51	24	11	42.3		
13	4	12	31	51	63	72	77	77	69	56	27	15	46.2		
16	2	11	31	50	63	72	78	78	68	52	23	12	45		
19	- 1	9	26	43	56	64	69	67	58	44	21	11	38.9		
22	- 2	8	23	39	50	58	62	62	54	41	20	9	35.3		
Ave 01 - 22	- 2.1	7.4	24.5	43.8	54.8	62.7	67.1	65.9	58.5	45.4	21.3	9.2	38.4		
Ave 19 - 04	-2.8	6.5	22.5	38.8	49.8	57	61.3	60	52.8	40.3	19.5	9	34.6		
Ave 07 - 16	.5	8.8	27.5	47	59.8	68.5	73.5	72.8	63.8	49.8	23	11	42.2		
Ave 19 - 07	-3	6	22.2	39	50.4	57.8	62.2	60.6	53	40.2	19.2	8.4	34.7		
Ave 10 - 16	2	10.3	29.7	49.3	62	71	76	76	67	53	24.7	12.7	44.5		

TABLE NO. 5 - B					LOCATION _____					YEAR _____				
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS														
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave	
01														
04														
07														
10														
13														
16														
19														
22														
Ave 01 - 22														
Ave 19 - 04														
Ave 07 - 16														
Ave 19 - 07														
Ave 10 - 16														

TABLE NO. 5 - C - 1								LOCATION GLASGOW, MONTANA						
								FIVE YEARS 1974-1978						
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 04	1974	8.8	23.5	26	41.3	45.8	60	67	58.3	49.3	43	29.3	23	39.6
	1975	17	10.5	20.8	33	47.8	56.5	67	59	49.8	39.8	26.8	16.8	37.1
	1976	12.8	26.8	25.3	42.3	51.8	57.8	64.5	63.8	53.3	37.5	22.5	18.3	39.7
	1977	2.8	24.8	28.8	42.5	53.5	60.5	63.3	56.3	51	39.8	21.5	7.8	37.7
	1978	-2.8	6.5	22.5	38.8	49.8	57	61.3	60	52.8	40.3	19.5	9	34.6
5-Yr. Ave		8.3	18.4	24.7	39.6	49.7	58.4	64.6	59.5	51.2	40.1	23.9	15	37.7
Day 07 - 16	1974	11.8	27.3	32.3	52.8	55.3	73.3	79.5	68.8	60.5	54.3	35.3	27.3	48.2
	1975	21.3	14.8	28.3	39.3	57.5	68.5	79.8	70.3	62.3	47.8	32.8	20	45.2
	1976	16	31.3	32.8	52.8	65.5	68	75.8	76.3	66.8	46.5	29.3	20.3	48.5
	1977	4.5	28.8	37.8	56.8	64.5	71.3	75.3	67	59.3	49.3	26.8	10	46
	1978	.5	8.8	27.5	47	59.8	68.5	73.5	72.8	63.8	49.8	23	11	42.2
5-Yr. Ave		10.8	22.2	31.7	49.7	60.5	69.9	76.8	71	62.5	49.5	29.4	17.7	46
Day/Night Dif.		2.5	3.8	7	10.1	10.8	11.5	12.2	11.5	11.3	9.4	5.5	2.7	8.3

TABLE NO. 5 - C - 2														GLASGOW, LOCATION MONTANA FIVE YEARS 1974-1978										
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH																								
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave										
Night 19 - 07	1974	8.4	23	25.8	41.8	46.6	61	67.8	58.8	49.4	42.8	28.8	22.6	39.7										
	1975	16.4	9.8	20.6	33.2	48.4	57.6	67.8	59.4	50.2	39.6	26.4	16.4	37.2										
	1976	12.4	26.6	25	42.6	52.8	58.6	65	64.2	53.6	37.2	22	18	39.8										
	1977	2.2	24.2	28.6	43	54	61.2	63.8	56.8	51	39.6	21	7.6	37.8										
	1978	-3	6	22.2	39	50.4	57.8	62.2	60.6	53	40.2	19.2	8.4	34.7										
5-Yr. Ave		7.2	17.9	24.4	39.9	50.4	59.2	65.3	60	51.4	39.9	23.5	14.6	37.8										
Day 10 - 16	1974	13.3	29.3	34.7	55.7	57	76	82.3	71.3	64	58.3	38	29.3	50.8										
	1975	23.7	17.3	31	41	59	70.7	82.7	73.3	65.7	50.7	35.3	21.7	47.7										
	1976	17.7	33	35.7	55.7	68.3	70	78.7	79.3	70.7	50	32.3	21.3	51.1										
	1977	6	31	41	60.7	67.3	73.7	78.3	69.7	62	52.7	29.3	11	48.6										
	1978	2	10.3	29.7	49.3	62	71	76	76	67	53	24.7	12.7	44.5										
5-Yr. Ave		12.5	24.2	34.4	52.5	62.7	72.3	79.6	73.9	65.9	52.9	31.9	19.2	48.5										
Day/Night Dif.		5.3	6.3	10	12.6	12.3	13.1	14.3	13.9	14.5	13	8.4	4.6	10.7										

TABLE NO. 5 - C - 3

LOCATION GLASGOW, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	10.4	25.5	29.6	47.5	50.7	66.2	73.3	64	55.4	49.2	33.2	25.1	44.2	
1975	18.5	12.6	24.7	35.9	52.8	62.4	73.1	64.9	56.3	45	30.1	18.5	41.2	
1976	13.8	29.5	29.3	47.8	58.2	62.5	70.3	70	59.8	42.2	26.4	18.9	44.1	
1977	3.1	26.5	33.6	48.2	58.3	65.7	69.1	61.2	55.2	46	24.5	8.3	41.6	
1978	-2.1	7.4	24.5	43.8	54.8	62.7	67.1	65.9	58.5	45.4	21.3	9.2	38.2	
5-Yr. Ave.	8.7	20.3	28.3	44.6	55	63.9	70.6	65.2	57	45.6	27.1	16	41.9	

MONTHLY WET BULB TEMPERATURE

LOCATION GLASGOW, MONTANA

MONTH July, 1976

INTERIOR DESIGN CONDITIONS 78 °db

65 °wb

wb T	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb T	
	1	2	3	4	5	6	7	8✓	9✓	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
60																																	60	
61																																	61	
62																																	62	
63																																	63	
64																																	64	
65	3					3											3	3	3				3									18	65	
66						6			3								3	3	3	6			3		3	9						36	66	
67	3						3	3	3								3	3					3									21	67	
68	3							3									3						3									12	68	
69			3				3	3										3			6											18	69	
70							6				3																					9	70	
71				3																			3									6	71	
72											3																					3	72	
73				3																												3	73	
74				3																												3	74	
75																																	75	
76																																	76	
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89																																	89	
90																																	90	
91																																	91	
92																																	92	
93																																	93	
Total Hours of Occurrence and Weight Average Wet Bulb Temperature for Month																																	129	67.6

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summarized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH												
LOCATION GLASGOW, MONTANA							YEAR 1974-1978					
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May							3	65	3	65	1.2	65
Ju	51	68.2	24	67.5	21	67.3	3	66	18	69.5	23.4	67.7
Jul	126	68.4	138	69.3	129	67.6	30	66.3	45	66.7	93.6	67.7
Aug	12	65	21	66.4	81	66.3	3	66	27	65.6	28.8	65.7
Sep					3	65			3	65	1.2	65
Oct												
Nov												
Dec												
Total	189	68.1	183	68.7	234	67.1	39	66.2	96	66.8	148.2	67.4
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

TABLE NO. 6						Location
PERCENT OF SUNSHINE - MONTHLY AVERAGE						GLASGOW, MONTANA
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	7.3	6.0	6.8	6.5	6.7	6.7
Feb.	7.4	6.0	7.4	7.0	8.4	7.2
Mar.	7.7	6.6	6.0	6.6	8.1	7.0
Apr.	7.1	8.0	6.1	4.7	7.7	6.7
May	8.4	7.4	5.1	6.4	7.0	6.9
Jun.	4.3	5.8	6.0	6.1	5.3	5.5
Jul.	4.4	4.3	4.2	5.9	4.7	4.7
Aug.	6.5	5.0	4.5	6.4	4.9	5.5
Sept.	5.5	3.9	4.1	7.2	5.3	5.2
Oct.	5.6	7.4	7.0	6.3	5.7	6.4
Nov.	5.5	7.0	5.5	6.5	7.7	6.4
Dec.	6.9	6.9	8.3	7.7	6.4	7.2
Yearly	6.4	6.2	5.9	6.4	6.5	6.3

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

GLASGOW, MONTANA		48° N.L. P= 1.05		Single Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	232	6	14.1	42	18,124
Feb	260	7	20.3	39	19,874
Mar	266	7	30.4	48	27,707
Apr	251	7	48.9	43	22,665
May	232	7	60.5	52	26,179
Jun	223	7	68	60	28,098
Jul	227	7	77.4	81	39,900
Aug	242	7	76	74	38,860
Sep	254	7	63.8	63	33,604
Oct	247	7	52.8	52	27,871
Nov	245	5	34.1	43	15,803
Dec	227	5	21.8	42	14,778

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

GLASGOW, MONTANA		48° N.L. P= 1.05		Double Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	220	6	14.1	42	17,186
Feb	247	7	20.3	39	18,881
Mar	252	7	30.4	48	26,248
Apr	238	7	48.9	43	21,491
May	220	7	60.5	52	24,825
Jun	212	7	68	6	26,712
Jul	215	7	77.4	81	37,791
Aug	230	7	76	74	36,933
Sep	241	7	63.8	63	31,884
Oct	234	7	52.8	52	26,405
Nov	232	5	34.1	43	14,964
Dec	215	5	21.8	42	13,997

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

GLASGOW, MONTANA		48° N.L. P=1.05		Concentrating Collector		
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	250	5	14.1	42	525	16,275
Feb	284	7	20.3	39	775	21,709
Mar	289	11	30.4	48	1526	47,304
Apr	268	11	48.9	43	1268	38,029
May	256	11	60.5	52	1464	45,394
Jun	247	11	68	6	1630	48,906
Jul	248	11	77.4	81	2210	68,500
Aug	259	10	76	74	1917	59,415
Sep	269	9	63.8	63	1525	45,757
Oct	267	7	52.8	52	972	30,128
Nov	244	5	34.1	43	525	15,738
Dec	224	5	21.8	42	470	14,582
					AV MO	37,645

GREAT FALLS WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded at Great Falls recording station.

TABLE NO. 1

LOCATION		GREAT FALLS, MONTANA										YEAR 1978		MONTH December		TEMPERATURE RECORD											
D	A	Hours Per Day of Given Temperature - 5° Increment																									
		Y-17½	-12½	-7½	-2½	2½	7½	12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½		
1						6	9	3	.6																		
2			6	6	9	3																					
3								3	3	3	3	3	6	3													
4										6	12	3	3														
5								6	12	6																	
6						9	12	3																			
7						9	9	6																			
8							9	3	6	6																	
9										6	3	15															
10											18	6															
11												6	12	6													
12								6	3	12	3																
13										9	9	6															
14												12	12														
15										9	12	3															
16										9	9	6															
17											6	12	6														
18								6	12	3		3															
19								6	9	6	3																
20								3		3	6	12															
21									3	6			9	6													
22									3		12	9															
23								3	3	3	3	9	3														
24										3	6	3	12														
25									9	12	3																
26								6	6	12																	
27						6	3	6	9																		
28			3	18	3																						
29	18	6																									
30	12	12																									
31	6	6	3	3	6																						
Tot	36	33	27	15	39	42	54	87	105	117	120	60	9														

GREAT FALLS, MONTANA

DEGREE HOUR TABLE NO. 1B
5-Year Average 1974 - 1978

T E M P. E R E T U R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No.of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	46.2	9.2		8763.5	570,369.5
-19			18.4	23.1	8754.3	561,628.9
-18			27.6	46.2	8745.1	552,888.3
-17			36.8	69.3	8735.9	544,147.7
-16			46	92.4	8726.7	535,407.1
-15	-15 thru -11 -12½	60	58	115.5	8717.5	526,666.5
-14			70	191.5	8705.5	517,979.0
-13			82	267.5	8693.5	509,291.5
-12			94	343.5	8681.5	500,604.0
-11			106	419.5	8669.5	491,916.5
-10	-10 thru -6 -7½	108	127.6	495.5	8657.5	483,229.0
- 9			149.2	655.5	8635.9	474,625.5
- 8			170.8	815.5	8614.3	466,022.0
- 7			192.4	975.5	8592.7	457,418.5
- 6			214	1,135.5	8571.1	448,815.0
- 5	- 5 thru -1 -2½	90.6	232.1	1,295.5	8549.5	440,211.5
- 4			250.2	1,554.8	8531.4	431,707.2
- 3			268.3	1,814.1	8513.3	423,202.9
- 2			286.4	2,073.4	8495.2	414,698.6
- 1			304.5	2,332.7	8477.1	406,194.3
0	0 thru 4 2½	166.2	337.7	2,592.0	8459	397,690.0
1			370.9	2,979.6	8425.8	389,313.9
2			404.1	3,367.2	8392.6	380,937.8
3			437.3	3,754.8	8359.4	372,561.7
4			470.5	4,142.4	8326.2	364,185.6
5	5 thru 9 7½	163.2	503.1	4,530.0	8293	355,809.5
6			535.7	5,082.1	8260.4	347,597.9
7			568.3	5,634.2	8227.8	339,386.3
8			600.9	6,186.3	8195.2	331,174.7
9			633.5	6,738.4	8162.6	322,963.1
10	10 thru 14 12½	210.6	675.6	7,290.5	8130	314,751.5
11			717.7	8,029.3	8087.9	306,726.7
12			759.8	8,768.1	8045.8	298,701.9
13			801.9	9,506.9	8003.7	290,677.1
14			844	10,245.7	7961.6	282,652.3
15	15 thru 19 17½	202.8	884.6	10,984.5	7919.5	274,627.5
16			925.2	11,929.9	7878.9	266,809.6
17			965.8	12,875.3	7838.3	258,991.7
18			1006.4	13,820.7	7797.7	251,173.8
19			1047	14,766.1	7757.1	243,355.9
20	20 thru 24 22½	311.4	1109.3	15,711.5	7716.5	235,538.0
21			1171.6	16,914.2	7654.2	227,977.3
22			1233.9	18,116.9	7591.9	220,416.6
23			1296.2	19,319.6	7529.6	212,855.9
24			1358.5	20,522.3	7467.3	205,295.2
25	25 thru 29 27½	494.4	1457.3	21,725.0	7405	197,734.5
26			1556.1	23,330.7	7306.2	190,576.3
27			1654.9	24,936.4	7207.4	183,418.1
28			1753.7	26,542.1	7108.6	176,259.9
29			1852.5	28,147.8	7009.8	169,101.7
30	30 thru 34 32½	702	1992.9	29,753.5	6911	161,943.5
31			2133.3	31,957.0	6770.6	155,383.5
32			2273.7	34,160.5	6630.2	148,823.5
33			2414.1	36,364.0	6489.8	142,263.5
34			2554.5	38,567.5	6349.4	135,703.5
35	35 thru 39 37½	813	2717.1	40,771.0	6209	129,143.5
36			2879.7	43,732.0	6046.4	123,341.0
37			3042.3	46,693.0	5883.8	117,538.5
38			3204.9	49,654.0	5721.2	111,736.0
39			3367.5	52,615.0	5558.6	105,933.5

GREAT FALLS, MONTANA

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

TEMPERATURE D E G R E E S	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	841.2	3535.7	55,576.0	5396	100,131.0
41			3703.9	59,364.1	5227.8	95,155.4
42			3872.1	63,152.2	5059.6	90,179.8
43			4040.3	66,940.3	4891.4	85,204.2
44			4208.5	70,728.4	4723.2	80,228.6
45	45 thru 49 47½	754.8	4359.5	74,516.5	4555	75,253.0
46			4510.5	79,102.4	4404	71,075.6
47			4661.5	83,688.3	4253	66,898.2
48			4812.5	88,274.2	4102	62,720.8
49			4963.5	92,860.1	3951	58,543.4
50	50 thru 54 52½	854.4	5134.4	97,446.0	3800	54,366.0
51			5305.3	102,836.7	3629.1	50,993.3
52			5476.2	108,227.4	3458.2	47,620.6
53			5647.1	113,618.1	3287.3	44,247.9
54			5818	119,008.8	3116.4	40,875.2
55	55 thru 59 57½	760.2	5970	124,399.5	2945.5	37,502.5
56			6122	130,597.6	2793.5	34,936.9
57			6274	136,795.7	2641.5	32,371.3
58			6426	142,993.8	2489.5	29,805.7
59			6578	149,191.9	2337.5	27,240.1
60	60 thru 64 62½	651.6	6708.3	155,390.0	2185.5	24,674.5
61			6838.6	162,293.8	2055.2	22,814.7
62			6968.9	169,197.6	1924.9	20,954.9
63			7099.2	176,101.4	1794.6	19,095.1
64			7229.5	183,005.2	1664.3	17,235.3
65	65 thru 69 67½	479.4	7325.4	189,909.0	1534	15,375.5
66			7421.3	197,378.2	1438.1	14,081.3
67			7517.2	204,847.4	1342.2	12,787.1
68			7613.1	212,316.6	1246.3	11,492.9
69			7709	219,785.8	1150.4	10,198.7
70	70 thru 74 72½	396.6	7788.3	227,255.0	1054.5	8,904.5
71			7867.6	235,162.3	975.2	8,048.2
72			7946.9	243,069.6	895.9	7,191.9
73			8026.2	250,976.9	816.6	6,335.6
74			8105.5	258,884.2	737.3	5,479.3
75	75 thru 79 77½	293.4	8164.2	266,791.5	658	4,623.0
76			8222.9	275,043.7	599.3	4,111.8
77			8281.6	283,295.9	540.6	3,600.6
78			8340.3	291,548.1	481.9	3,089.4
79			8399	299,800.3	423.2	2,578.2
80	80 thru 84 82½	205.2	8440	308,052.5	364.5	2,067.0
81			8481	316,554.1	323.5	1,804.9
82			8522	325,055.7	282.5	1,542.8
83			8563	333,557.3	241.5	1,280.7
84			8604	342,058.9	200.5	1,018.6
85	85 thru 89 87½	96.6	8623.3	350,560.5	159.5	756.5
86			8642.6	359,212.8	140.2	645.2
87			8661.9	367,865.1	120.9	533.9
88			8681.2	376,517.4	101.6	422.6
89			8700.5	385,169.7	82.3	311.3
90	90 thru 94 92½	54.6	8711.4	393,822.0	63	200.0
91			8722.3	402,549.8	52.1	164.2
92			8733.2	411,277.6	41.2	128.4
93			8744.1	420,005.4	30.3	92.6
94			8755	428,733.2	19.4	56.8
95	95 thru 99 97½	8.4	8756.7	437,461.0	8.5	21.0
96			8758.4	446,220.2	6.8	16.8
97			8760.1	454,979.4	5.1	12.6
98			8761.8	463,738.6	3.4	8.4
99			8763.5	472,497.8	1.7	4.2

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GREAT FALLS, MONTANAYEAR: 1974

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	16	51	46	45	51	55	52	53	51	
Feb.	25	39	39	38	46	56	54	45	41	
Mar.	27	35	33	46	57	63	61	54	51	
Apr.	25	56	46	55	77	80	80	63	60	
May	5	45	47	57	70	79	76	63	58	
June	19	74	72	77	83	93	94	85	75	
July	17	65	65	73	90	94	95	83	75	
Aug.	5	67	62	76	88	94	95	84	76	
Sept.	25	60	62	67	79	85	83	73	67	
Oct.	16	61	61	65	76	79	76	61	54	
Nov.	21	53	55	56	62	62	58	54	35	
Dec.	4	44	41	45	52	56	52	47	42	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	5	-16	-18	-26	-15	-11	-12	-12	-07	
Feb.	2	29	04	04	07	25	32	31	27	
Mar.	22	9	6	7	14	20	21	16	11	
Apr.	4	30	28	36	46	49	49	37	38	
May	16	32	31	41	46	45	45	38	33	
June	1	40	36	53	63	69	72	60	54	
July	8	54	52	59	74	82	82	68	62	
Aug.	31	47	44	50	55	56	50	48	48	
Sept.	29	34	32	31	36	42	44	40	39	
Oct.	31	39	39	36	36	37	36	35	35	
Nov.	22	23	22	23	23	26	22	21	24	
Dec.	23	30	29	26	14	11	10	10	10	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GREAT FALLS, MONTANA

YEAR: 1975

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	17	41	43	43	44	47	46	42	45	
Feb.	28	31	32	33	38	45	43	36	36	
Mar.	18	37	35	39	48	51	48	42	42	
Apr.	24	39	38	46	53	56	56	51	45	
May	14	46	42	57	68	77	77	69	62	
June	24	54	54	63	71	80	84	77	67	
July	28	75	68	84	92	98	98	84	79	
Aug.	6	66	58	73	86	91	92	78	74	
Sept.	15	53	55	65	79	85	84	69	60	
Oct.	2	51	50	60	74	80	78	65	53	
Nov.	4	57	53	53	65	70	61	56	59	
Dec.	9	51	52	52	57	59	54	46	31	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	10	-03	-09	-12	-12	-10	-14	-16	-16	
Feb.	5	-21	-21	-20	-15	-06	-10	-14	-03	
Mar.	28	01	03	04	15	22	25	24	24	
Apr.	6	-05	-01	01	08	13	14	12	10	
May	6	36	33	33	37	38	39	39	39	
June	10	44	42	53	63	68	69	63	57	
July	31	52	52	53	56	50	62	58	54	
Aug.	24	50	44	45	54	57	57	52	48	
Sept.	19	35	34	39	52	57	58	51	46	
Oct.	6	63	60	56	58	61	53	48	45	
Nov.	29	01	01	0	02	02	-03	-05	-05	
Dec.	14	-02	-06	04	17	24	25	25	27	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: GREAT FALLS, MONTANA

YEAR: 1976

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	17	42	43	41	52	57	50	48	46	
Feb.	23	43	43	42	55	58	54	42	36	
Mar.	31	43	43	50	61	70	68	57	48	
Apr.	12	54	54	61	72	76	71	60	57	
May	27	51	49	62	78	86	85	76	69	
June	30	64	62	70	86	94	99	86	66	
July	23	56	54	68	84	93	95	86	79	
Aug.	22	59	57	71	88	95	93	77	74	
Sept.	5	64	63	72	85	92	93	82	75	
Oct.	1	59	58	60	75	80	80	68	64	
Nov.	17	53	54	55	57	61	63	60	54	
Dec.	16	49	52	52	53	55	51	46	50	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	7	-16	-15	-15	-14	-11	-13	-15	-16	
Feb.	29	-05	-05	-04	06	18	26	20	02	
Mar.	3	-17	-18	-17	-11	-01	-01	-05	-08	
Apr.	1	33	32	29	28	31	31	30	29	
May	15	37	32	46	53	58	60	56	51	
June	13	52	44	58	61	51	51	47	44	
July	28	51	48	63	74	83	86	76	67	
Aug.	27	48	45	54	63	69	70	59	57	
Sept.	19	39	39	40	50	57	61	54	45	
Oct.	24	24	25	24	46	53	53	40	47	
Nov.	27	03	04	09	14	17	17	17	19	
Dec.	31	20	21	15	14	14	12	10	07	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GREAT FALLS, MONTANA

YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	6	21	21	23	24	29	27	28	30	
Feb.	20	31	39	41	52	65	62	49	45	
Mar.	23	42	40	50	61	64	63	48	42	
Apr.	2	15	10	16	25	25	21	17	15	
May	3	54	47	61	69	76	77	73	59	
June	6	61	55	69	83	91	92	82	73	
July	21	69	64	70	86	92	90	76	74	
Aug.	3	66	57	65	70	79	72	60	57	
Sept.	4	60	60	68	80	86	81	71	68	
Oct.	18	51	51	55	71	77	71	61	59	
Nov.	11	43	48	47	59	66	56	55	52	
Dec.	11	43	45	45	48	46	38	45	40	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	2	-19	-04	03	11	18	12	20	16	
Feb.	2	22	23	24	34	45	42	36	34	
Mar.	20	07	04	15	29	36	37	29	26	
Apr.	25	52	38	55	68	75	77	66	57	
May	17	35	34	32	33	33	34	32	29	
June	17	46	44	56	65	72	71	66	60	
July	13	51	47	49	52	58	63	60	51	
Aug.	31	42	39	48	58	62	63	57	52	
Sept.	25	39	38	46	58	60	58	47	43	
Oct.	3	38	40	37	38	41	42	37	35	
Nov.	20	-02	-04	-05	-03	-03	-10	-07	-17	
Dec.	8	-27	-24	-24	-21	-19	-24	-26	-24	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: GREAT FALLS, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	6	20	37	38	40	39	32	02	-03	
Feb.	23	38	40	41	41	43	42	32	30	
Mar.	29	44	44	57	69	75	75	64	58	
Apr.	28	44	42	49	60	65	63	56	48	
May	14	49	49	57	74	79	72	69	66	
June	5	56	52	68	80	84	82	73	61	
July	24	69	67	78	91	96	96	83	72	
Aug.	6	66	57	74	87	94	95	79	70	
Sept.	2	56	58	71	86	93	94	80	72	
Oct.	9	47	47	53	68	71	73	60	53	
Nov.	1	47	47	48	61	65	60	51	49	
Dec.	11	34	36	39	41	41	39	37	33	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	7	-10	-12	-11	-08	-05	-07	-05	-06	
Feb.	13	-12	-17	-12	-12	-07	-10	-10	-10	
Mar.	3	-14	-16	-17	-10	-02	-04	-10	-10	
Apr.	14	29	27	34	40	52	52	40	35	
May	4	35	32	37	45	47	48	40	37	
June	12	44	39	58	66	72	76	70	63	
July	21	49	47	61	71	75	78	71	64	
Aug.	17	45	45	48	47	48	49	48	45	
Sept.	17	34	33	41	50	54	54	45	43	
Oct.	30	25	26	28	42	47	43	32	32	
Nov.	21	-15	-15	-13	00	03	04	-04	-01	
Dec.	29	-14	-17	-20	-16	-13	-16	-16	-15	

TABLE NO. 5A

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: GREAT FALLS, MONTANAYEAR: Average - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.		35	38	38	42.2	45.4	41.4	34.6	33.8	
Feb.		36.4	38.6	39	46.4	53.4	51	41.8	37.6	
Mar.		40.2	39	48.4	59.2	64.6	63	53	48.2	
Apr.		41.6	38	45.4	57.4	60.4	58.2	49.4	45	
May		49	46.8	58.8	71.2	79.4	77.4	70	62.8	
June		61.8	59	69.4	80.6	88.4	90.2	80.6	68.4	
July		66.8	63.6	74.6	88.6	94.6	94.8	82.4	75.8	
Aug.		64.8	58.2	71.8	83.8	90.6	89.4	75.6	70.2	
Sept.		58.6	59.6	68.6	81.8	88.2	87	75	68.4	
Oct.		53.8	53.4	58.6	72.8	77.4	75.6	63	56.6	
Nov.		50.6	50.4	51.8	60.6	64.8	59.6	55.2	49.8	
Dec.		44.2	45.2	46.6	50.2	51.4	46.8	44.2	39.2	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.		-12.8	-11.6	-12.2	-7.6	3.8	6.8	-5.6	5.8	
Feb.		- 2.6	- 3.2	- 1.6	4	15	16	12.6	10	
Mar.		- 2.8	- 4.2	- 1.6	7.4	15	15.6	10.8	8.6	
Apr.		27.8	24.8	31	38	44	44.6	37	33.8	
May		35	32.4	37.8	42.8	44.2	45.2	41	37.8	
June		45.2	41	55.6	63.6	66.4	67.8	61.2	55.6	
July		51.4	49.2	57	65.4	69.6	74.2	66.6	59.6	
Aug.		46.4	43.4	49	55.4	58.4	57.8	52.8	50	
Sept.		36.2	35.2	39.4	49.2	54	55	47.4	43.2	
Oct.		37.8	38	36.2	44	47.8	45.4	38.4	38.8	
Nov.		2	1.6	2.8	7.2	9	6	4.4	4	
Dec.		1.4	.6	.2	1.6	3.4	1.4	.6	1	

TABLE NO. 5 - B <div> GREAT FALLS, LOCATION <u>MONTANA</u> YEAR <u>1974</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	18	31	30	40	42	57	63	56	47	44	35	30	41.1
04	16	31	28	38	41	55	59	53	44	42	34	30	39.3
07	17	31	30	43	48	64	69	58	50	45	35	30	43.3
10	21	37	37	52	53	72	78	66	61	56	43	36	51
13	23	41	41	55	57	78	84	72	66	62	47	39	55.4
16	22	40	40	56	56	78	85	71	65	59	42	34	54
19	21	34	33	49	50	70	77	64	56	50	37	31	47.7
22	20	32	30	44	44	63	68	59	51	47	36	30	43.6
Ave 01 - 22	19.8	33.8	33.3	47.1	49.5	66.9	72.9	62.9	54.8	51.4	38.7	32.5	46.9
Ave 19 - 04	18.8	32	30.3	42.8	44.3	61.3	66.8	58	49.5	45.8	45.8	30.3	42.9
Ave 07 - 16	20.8	37.3	37	51.5	53.5	73	79	66.8	60.5	55.5	41.8	34.8	50.9
Ave 19 - 07	18.4	31.8	30.2	45	45	61.8	67.2	58	49.6	45.6	35.4	30.2	43
Ave 10 - 16	22	39.3	36.7	54.3	55.3	76	82	69.7	64	59	44	36.3	53.5

TABLE NO. 5 - B <div> GREAT FALLS, LOCATION <u>MONTANA</u> YEAR <u>1975</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	22	10	23	26	43	51	63	56	48	42	30	27	36.8
04	21	9	23	25	41	49	60	54	45	41	30	28	35.5
07	21	10	24	28	48	56	70	60	52	42	29	28	39
10	25	14	30	34	54	63	78	69	63	50	36	34	45.8
13	28	19	33	37	57	67	82	74	69	53	39	36	49.5
16	26	18	32	38	57	67	82	74	70	50	34	33	48.4
19	23	13	26	33	50	60	74	66	59	44	31	30	42.4
22	22	13	24	30	46	54	67	60	52	42	30	27	38.9
Ave 01 - 22	22.7	13.1	27.4	30.9	50	58.8	71.8	64.8	57.3	45.7	32.9	28.6	42
Ave 19 - 04	22	11.3	24	28.5	45	53.5	66	59	51	42.3	30.3	28	38.4
Ave 07 - 16	25	15.3	29.8	34.3	54	63.3	78	69.3	63.5	48.8	34.5	32.8	45.7
Ave 19 - 07	21.8	11	24	28.4	45.6	54	66.8	59.2	51.2	42.2	30	28	38.5
Ave 10 - 16	26.3	17	31.7	36.3	56	65.7	80.7	72.3	67.3	51	36.3	34.3	47.9

TABLE NO. 5 - B <div> GREAT FALLS, LOCATION <u>MONTANA</u> YEAR <u>1976</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	24	27	25	40	49	52	61	59	53	40	34	29	41.1
04	24	27	25	37	46	50	57	57	51	39	33	30	39.7
07	23	26	27	42	54	58	66	64	56	40	32	30	43.2
10	28	33	35	50	62	65	75	73	67	50	40	35	51.1
13	32	36	40	54	67	69	81	78	72	55	44	38	55.5
16	25	35	39	55	67	69	81	78	73	55	42	35	54.8
19	26	29	31	47	59	63	73	69	63	47	37	32	48
22	25	27	28	42	53	55	66	63	56	44	34	30	43.6
Ave 01 - 22	26.4	30.5	31.6	46.1	56.9	61.0	70.3	67.9	61.2	45.5	36.6	31.6	47.1
Ave 19 - 04	24.8	27.5	27.3	41.5	51.8	55	64.3	62	55.8	42.5	34.5	30.3	43.1
Ave 07 - 16	28	32.5	35.3	50.3	62.5	65.3	75.8	73.3	67	50	39.5	34.5	51.2
Ave 19 - 07	24.4	27.2	27.2	41.6	52.2	55.6	64.6	62.4	55.8	42	34	30.2	43.1
Ave 10 - 16	29.7	34.7	38	53	65.3	67.6	79	76.3	70.7	53.3	42	36	53.8

TABLE NO. 5 - B <div> GREAT FALLS, LOCATION <u>MONTANA</u> YEAR <u>1977</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	19	34	30	39	44	56	59	55	50	43	27	16	39.3
04	18	34	28	36	42	53	56	53	46	41	28	16	37.6
07	19	33	31	44	49	63	65	59	51	43	28	16	41.8
10	23	43	38	54	56	72	74	66	60	52	34	21	49.4
13	27	48	41	58	59	76	79	72	66	57	37	22	53.5
16	25	45	41	59	59	75	78	72	65	54	33	18	52
19	23	38	34	50	52	68	71	64	57	46	29	17	45.8
22	21	35	31	43	47	60	63	60	53	43	28	16	41.7
Ave 01 - 22	21.6	39.2	34	47.1	51.3	65.4	68	62.5	56.1	47.8	30.8	16.5	45
Ave 19 - 04	20.3	35.3	30.8	42	46.3	59.3	62.3	58	51.5	43.3	28	16.3	41.1
Ave 07 - 16	23.5	42.3	37.8	53.8	55.8	71.5	74	67.3	60.5	51.5	33	19.3	49.2
Ave 19 - 07	20	34.8	30.8	42.4	46.8	60	62.8	58.2	51.4	43.2	28	16.2	41.2
Ave 10 - 16	25	45.3	40	57	58	74.3	77	70	63.7	54.3	34.7	20.3	51.6

TABLE NO. 5 - B		GREAT FALLS, LOCATION MONTANA YEAR 1978											
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	7	13	29	38	45	53	58	57	51	42	23	18	36.2
04	7	12	28	37	43	51	55	55	51	41	23	16	34.9
07	7	13	30	41	49	60	65	63	55	44	23	16	38.8
10	9	17	37	47	55	69	73	72	64	55	27	18	45.3
13	13	19	41	52	59	72	78	77	68	58	28	21	48.8
16	10	18	39	51	57	72	77	77	67	56	25	19	47.3
19	8	15	33	44	50	65	68	68	58	48	23	17	41.4
22	7	15	31	40	46	57	62	63	54	44	22	18	38.3
Ave 01 - 22	7.7	14.5	33.5	44.1	51.3	62.5	67.1	66.5	58.8	48.8	23.9	17.4	41.3
Ave 19 - 04	7.3	13.8	30.3	39.8	46	56.5	60.8	53.5	53.5	43.8	22.8	17.3	37.7
Ave 07 - 16	9.8	16.8	36.8	47.8	47.8	55	73.3	72.3	63.5	53.2	25.5	18.5	45.1
Ave 19 - 07	7.2	13.6	30.2	40	46.6	57.2	61.6	61.2	53.8	43.8	22.8	17	37.9
Ave 10 - 16	10.7	18	39	50	57	71	76	75.3	66.3	56.3	26.7	19.3	47.1

TABLE NO. 5 - B				LOCATION _____ YEAR _____									
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01													
04													
07													
10													
13													
16													
19													
22													
Ave 01 - 22													
Ave 19 - 04													
Ave 07 - 16													
Ave 19 - 07													
Ave 10 - 16													

TABLE NO. 5 - C - 1								LOCATION <u>GREAT FALLS, MONTANA</u>						
								FIVE YEARS <u>1974-1978</u>						
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 04	1974	18.8	32	30.3	42.8	44.3	61.3	66.8	58	49.5	45.8	45.8	30.3	42.9
	1975	22	11.3	24	28.5	45	53.5	66	59	51	42.3	30.3	28	38.4
	1976	24.8	27.5	27.3	41.5	51.8	55	64.3	62	55.8	42.5	34.5	30.3	43.1
	1977	20.3	35.3	30.8	42	46.3	59.3	62.3	58	51.5	43.3	28	16.3	41.1
	1978	7.3	13.8	30.3	39.8	46	56.5	60.8	53.5	53.5	43.8	22.8	17.3	37.7
5-Yr. Ave		18.6	24	28.5	47.3	46.7	57	64	52.1	52.3	43.5	32.3	24.4	40.6
Day 07 - 16	1974	20.8	37.3	37	51.5	53.5	73	79	66.8	60.5	55.5	41.8	34.8	50.9
	1975	25	15.3	29.8	34.3	54	63.3	78	69.3	63.5	48.8	34.5	32.8	45.7
	1976	28	32.5	35.3	50.3	62.5	65.3	75.8	73.3	67	50	39.5	34.5	51.2
	1977	23.5	42.3	37.8	53.8	55.8	71.5	74	67.3	60.5	51.5	33	19.3	49.2
	1978	9.8	16.8	36.8	47.8	47.8	55	73.3	72.3	63.5	53.2	25.5	18.5	45.1
5-Yr. Ave		21.4	33.6	35.3	47.5	54.8	65.6	76	69.8	63	51.8	34.9	28	48.4
Day/Night Dif.		2.8	9.6	6.8	.2	8.0	8.6	12	10.4	10.7	8.3	2.6	3.6	7.8

TABLE NO. 5 - C - 2														LOCATION <u>GREAT FALLS, MONTANA</u>									
														FIVE YEARS <u>1974-1978</u>									
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH																							
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave									
Night 19 - 07	1974	18.4	31.8	30.2	45	45	61.8	67.2	58	49.6	45.6	35.4	30.2	43									
	1975	21.8	11	24	28.4	45.6	54	66.8	59.2	51.2	42.2	30	28	38.5									
	1976	24.4	27.2	27.2	41.6	52.2	55.6	64.6	62.4	55.8	42	34	30.2	43.1									
	1977	20	34.8	30.8	42.4	46.8	60	62.8	58.2	51.4	43.2	28	16.2	41.2									
	1978	7.2	13.6	30.2	40	46.6	57.2	61.6	61.2	53.8	43.8	22.8	17	37.9									
5-Yr. Ave		18.4	23.7	28.5	39.5	47	57.7	64.6	59.8	52.3	43.4	30	24	40.8									
Day 10 - 16	1974	22	39.3	36.7	54.3	55.3	76	82	69.7	64	59	44	36.3	53.5									
	1975	26.3	17	31.7	36.3	56	65.7	80.7	72.3	67.3	51	36.3	34.3	47.9									
	1976	29.7	34.7	38	53	65.3	67.6	79	76.3	70.7	53.3	42	36	53.8									
	1977	25	45.3	40	57	58	74.3	77	70	63.7	54.3	34.7	20.3	51.6									
	1978	10.7	18	39	50	57	71	76	75.3	66.3	56.3	26.7	19.3	47.1									
5-Yr. Ave		22.7	30.9	37.1	50.1	58.3	70.9	78.9	72.6	66.4	54.8	36.8	29.2	50.8									
Day/Night Dif.		4.3	7.2	8.6	10.6	11.3	13.2	14.3	12.8	14.1	11.4	6.8	5.2	10									

TABLE NO. 5 - C - 3

LOCATION GREAT FALLS, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	19.8	33.8	33.3	47.1	49.5	66.9	72.9	62.9	54.8	51.4	38.7	32.5	46.9	.95
1975	22.7	13.1	27.4	30.9	50	58.8	71.8	64.8	57.3	45.7	32.9	28.6	42	1.05
1976	26.4	30.5	31.6	46.1	56.9	61	70.3	67.9	61.2	45.5	36.6	31.6	47.1	.95
1977	21.6	39.2	34	47.1	51.3	65.4	68	62.5	56.1	47.8	30.8	16.5	45	.99
1978	7.7	14.5	33.5	44.1	51.3	62.5	67.1	66.5	58.8	48.8	23.9	17.4	41.3	.93
5-Yr. Ave.	19.6	26.2	32	43.1	51.8	62.9	69.8	64.9	57.6	47.8	32.6	25	44.5	1.

MONTHLY WET BULB TEMPERATURE

LOCATION GREAT FALLS, MONTANA

MONTH June, 1977

INTERIOR DESIGN CONDITIONS 78 °db

65 °wb

wb T	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb T	
	1	2	3	4	5	6	7	8✓	9✓	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
60																																		60
61																																		61
62																																		62
63																																		63
64																																		64
65						3	6																										9	65
66						6																											6	66
67																																		67
68																																		68
69																																		69
70																																		70
71																																		71
72																																		72
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88																																		88
89																																		89
90																																		90
91																																		91
92																																		92
93																																		93
Total Hours of Occurrence and Weight Average Wet Bulb Temperature for Month																																15	65.4	

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summerized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2			WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH									
LOCATION			GREAT FALLS, MONTANA				YEAR		1974-1978			
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May												
Ju	24	67			15	68.8	15	65.4	3	73	11.4	67.4
Jul	18	65.5	105	65.4	9	66.3	3	66	39	66.1	34.8	65.6
Aug			6	66	6	66					2.4	66
Sep									9	66.3	1.8	66.3
Oct												
Nov												
Dec												
Total	42	66.4	111	65.4	30	67.5	18	65.5	51	66.5	50.4	66.1
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

The average percent of sunshine for the six month air conditioning season in Toledo, Ohio is 55.5% based upon the five-year average of mid April to mid October.

TABLE NO. 6						Location <u>GREAT FALLS, MONTANA</u>
PERCENT OF SUNSHINE - MONTHLY AVERAGE						
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	32	34	41	30	49	37.2
Feb.	37	52	47	55	56	49.4
Mar.	60	47	72	46	54	55.8
Apr.	56	39	51	70	52	53.6
May	58	53	67	49	54	56.2
Jun.	80	57	44	63	61	61
Jul.	85	74	76	68	68	74.2
Aug.	67	77	81	61	62	69.6
Sept.	73	85	84	60	60	72.4
Oct.	71	54	64	57	64	62
Nov.	51	48	36	45	40	44
Dec.	49	34	52	29	39	40.6
Yearly	59.9	54.5	59.6	52.8	54.9	56.3

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

<div> <div>GREAT FALLS, MONTANA</div> <div> 47° N.L. $P = 1.05$ </div> <div>Single Glazed Collector</div> </div>					
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	232	6	24.9	48	20,713
Feb	260	7	31.3	57	29,047
Mar	266	7	35.5	66	38,097
Apr	251	7	49	61	32,153
May	232	7	59.2	63	31,717
Jun	223	7	66.5	65	30,440
Jul	227	7	76.5	80	39,407
Aug	242	7	74.6	77	40,436
Sep	254	7	63.7	68	36,271
Oct	247	7	53.9	61	32,695
Nov	245	5	39	46	16,905
Dec	227	5	30.6	45	15,833

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

GREAT FALLS, MONTANA		47° N.L. P= 1.05		Double Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	220	6	24.9	48	19,642
Feb	247	7	31.3	57	27,595
Mar	252	7	35.5	66	36,091
Apr	238	7	49	61	30,488
May	220	7	59.2	63	30,076
Jun	212	7	66.5	65	28,938
Jul	215	7	76.5	80	37,324
Aug	230	7	74.6	77	38,431
Sep	241	7	63.7	68	34,415
Oct	234	7	53.9	61	30,975
Nov	232	5	39	46	16,008
Dec	215	5	30.6	45	14,996

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

GREAT FALLS, MONTANA		47° N.L. P= 1.05		Concentrating Collector		
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	250	5	24.9	48	600	18,600
Feb	284	7	31.3	57	1133	31,728
Mar	289	11	35.5	66	2098	65,042
Apr	268	11	49	61	1798	53,948
May	256	11	59.2	63	1774	54,996
Jun	247	11	66.5	65	1766	52,982
Jul	248	11	76.5	80	2182	67,654
Aug	259	10	74.6	77	1994	61,823
Sep	269	9	63.7	68	1646	49,388
Oct	267	7	53.9	61	1140	35,343
Nov	244	5	39	46	561	16,836
Dec	224	5	30.6	45	504	15,624
					AV MO	43,664

HAVRE WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded at Havre recording station.

TABLE NO. 1

LOCATION		HAVRE, MONTANA										YEAR		1976		MONTH		November		TEMPERATURE RECORD									
D	A	Hours Per Day of Given Temperature - 5° Increment																											
		Y-17½	-12½	7½	-2½	2½	7½	12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½				
1										6			3	6	3	6													
2									3	9	3		6		3														
3								3	6		3	3	3	3		3													
4												6	3	6			6		3										
5												12	3	3	3	3													
6									3	6	3	3	6		3														
7								3	6			3		9	3														
8											6			9	6	3													
9									6	6	3		3	3	3														
10								6	9		6	3																	
11							9	6	3	3	3																		
12				6	6		3	3		3	3																		
13				6	3	3	3	3	3		3																		
14				6	3	3		3	3			3	3																
15								3		3		9	3	3	3														
16										3		6	3	6	6														
17													6	3	3	3	9												
18									9		12		3																
19								9	6		3	3	3																
20							3	3	9	3		6																	
21					3	6			3		9	3																	
22								6	3	9	3	3																	
23							3	3			3		3	6	6														
24												6	6	12															
25								3	6	3	9	3																	
26					6	9	6	3																					
27		3	6	3	6	6																							
28					3	6	3				12																		
29											15	9																	
30									6		12	6																	
31																													
Tot			3	6	27	33	30	24	57	84	81	93	78	57	69	42	18	15		3									

HAVRE, MONTANA

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E T U R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	75	15.0		8760.0	564,117.0
-19			30.0	7.5	8745.0	555,394.5
-18			45.0	36.0	8730.0	546,672.0
-17			60.0	67.5	8715.0	537,949.5
-16			75.0	120.0	8700.0	529,227.0
-15	-15 thru -11 -12½	83.4	91.7	187.5	8685.0	520,504.5
-14			108.4	304.2	8668.3	511,861.2
-13			125.0	420.9	8651.6	503,217.9
-12			141.7	537.6	8635.0	494,574.6
-11			158.4	654.3	8618.3	485,931.3
-10	-10 thru -6 -7½	108.6	180.1	771.0	8601.6	477,288.0
-9			201.8	983.7	8579.9	468,740.7
-8			223.6	1,196.4	8558.2	460,193.4
-7			245.3	1,409.1	8536.4	451,646.1
-6			267.0	1,621.8	8514.7	443,098.8
-5	- 5 thru -1 -2½	154.2	297.8	1,834.5	8493.0	434,551.5
-4			328.7	2,178.6	8462.2	426,135.6
-3			359.5	2,522.7	8431.3	417,719.7
-2			390.4	2,866.8	8400.5	409,303.8
-1			421.2	3,210.9	8369.6	400,887.9
0	0 thru 4 2½	197.4	460.7	3,555.0	8338.8	392,472.0
1			500.2	4,074.9	8299.3	384,231.9
2			539.6	4,594.8	8259.9	375,991.8
3			579.1	5,114.7	8220.4	367,751.7
4			618.6	5,634.6	8180.9	359,511.6
5	5 thru 9 7½	222	663.0	6,154.5	8141.4	351,271.5
6			707.4	6,884.1	8097.0	343,241.1
7			751.8	7,613.7	8052.6	335,210.7
8			796.2	8,343.3	8008.2	327,180.3
9			840.6	9,072.9	7963.8	319,149.9
10	10 thru 14 12½	214.8	883.6	9,802.5	7919.4	311,119.5
11			926.5	10,750.5	7876.4	303,307.5
12			969.5	11,698.5	7833.5	295,495.5
13			1012.4	12,646.5	7790.5	287,683.5
14			1055.4	13,594.5	7747.6	279,871.5
15	15 thru 19 17½	313.8	1118.2	14,542.5	7704.6	272,059.5
16			1180.9	15,754.8	7641.8	264,511.8
17			1243.7	16,967.1	7579.1	256,964.1
18			1306.4	18,179.4	7516.3	249,416.4
19			1369.2	19,391.7	7453.6	241,868.7
20	20 thru 24 22½	343.2	1437.8	20,604.0	7390.8	234,321.0
21			1506.5	22,144.8	7322.2	227,101.8
22			1575.1	23,685.6	7253.5	219,882.6
23			1643.0	25,226.4	7184.9	212,663.4
24			1712.4	26,767.2	7116.2	205,444.2
25	25 thru 29 27½	421.8	1796.8	28,308.0	7047.6	199,225.0
26			1881.1	30,231.3	6963.2	191,388.3
27			1965.5	32,154.6	6878.9	184,551.6
28			2049.8	34,077.9	6794.5	177,714.9
29			2134.2	36,001.2	6710.2	170,878.2
30	30 thru 34 32½	635.4	2261.3	37,924.5	6625.8	164,041.5
31			2388.4	40,777.4	6498.7	157,733.4
32			2515.4	42,828.3	6371.6	151,425.3
33			2642.5	45,280.2	6244.6	145,117.2
34			2769.6	47,732.1	6117.5	138,809.1
35	35 thru 39 37½	710.4	2911.7	50,184.0	5990.4	132,501.0
36			3053.8	53,308.8	5848.3	126,865.8
37			3195.8	56,433.6	5706.2	121,230.6
38			3337.9	59,558.4	5564.2	115,595.4
39			3480.0	62,683.2	5422.1	109,960.2

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E D E G R E E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	722.4	3624.5	65,808.0	5280.0	104,325.0
41			3769.0	69,649.2	5135.5	99,406.2
42			3913.4	73,490.4	4991.0	94,487.4
43			4057.9	77,331.6	4846.6	89,568.6
44			4202.4	81,172.8	4702.1	84,649.8
45	45 thru 49 47½	710.4	4344.5	85,014.0	4557.6	79,731.0
46			4486.6	89,571.6	4415.5	75,528.6
47			4628.6	94,129.2	4273.4	71,326.2
48			4770.7	98,686.8	4131.4	67,123.8
49			4912.8	103,244.4	3989.3	62,921.4
50	50 thru 54 52½	832.8	5079.4	107,802.0	3847.2	58,719.0
51			5245.9	113,131.2	3680.6	55,288.2
52			5412.5	118,460.4	3514.1	51,857.4
53			5579.0	123,789.6	3347.5	48,426.6
54			5745.6	129,118.8	3181.0	44,995.8
55	55 thru 59 57½	678.0	5881.2	134,448.0	3014.4	41,565.0
56			6016.8	140,532.6	2878.8	38,889.6
57			6152.4	146,617.2	2743.2	36,214.2
58			6288.0	152,701.8	2607.6	33,538.8
59			6423.6	158,786.4	2472.0	30,863.4
60	60 thru 64 62½	648.0	6553.2	164,871.0	2336.4	28,188.0
61			6682.8	171,618.6	2206.8	26,175.6
62			6812.4	178,366.2	2077.2	24,163.2
63			6942.0	185,113.8	1947.6	22,150.8
64			7071.6	191,861.4	1818.0	20,138.4
65	65 thru 69 67½	522.6	7176.1	198,609.0	1688.4	18,126.0
66			7280.6	205,941.9	1583.9	16,698.9
67			7385.2	213,274.8	1479.4	15,271.8
68			7489.7	220,607.7	1374.8	13,844.7
69			7594.2	227,940.6	1270.3	12,417.6
70	70 thru 74 72½	388.2	7671.8	235,273.5	1165.8	10,990.5
71			7749.5	243,061.8	1088.2	10,018.8
72			7827.1	250,850.1	1010.5	9,047.1
73			7904.8	254,638.4	932.9	8,075.4
74			7982.4	266,426.7	855.2	7,103.7
75	75 thru 79 77½	322.2	8046.8	274,215.0	777.6	6,132.0
76			8111.3	282,358.5	713.2	5,515.5
77			8175.7	290,502.0	648.7	4,899.0
78			8240.2	298,645.5	584.3	4,282.5
79			8304.6	306,789.0	519.8	3,666.0
80	80 thru 84 82½	221.4	8348.9	314,932.5	455.4	3,049.5
81			8393.2	323,347.8	411.1	2,704.8
82			8437.4	331,763.1	366.8	2,360.1
83			8481.7	340,178.4	322.6	2,015.4
84			8526.0	348,593.7	278.3	1,670.7
85	85 thru 89 87½	121.2	8550.2	357,009.0	234.0	1,326.0
86			8574.5	365,595.6	209.8	1,152.6
87			8598.7	374,182.2	185.5	979.2
88			8623.0	382,768.8	161.3	805.8
89			8647.2	391,355.4	137.0	632.4
90	90 thru 94 92½	77.4	8662.7	399,942.0	112.8	459.0
91			8678.2	408,627.9	97.3	384.9
92			8693.6	417,313.8	81.8	310.8
93			8709.1	425,999.7	66.4	236.7
94			8724.6	434,685.6	50.9	162.6
95	95 thru 99 97½	35.4	8731.7	443,371.5	35.4	88.5
96			8738.8	452,113.8	28.3	56.6
97			8745.8	460,856.1	21.2	31.9
98			8752.9	469,598.4	14.2	14.2
99			8760.0	478,340.7	7.1	3.5

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: HAVRE, MONTANAYEAR: 1974

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	16	42	42	44	50	49	48	41	45	
Feb.	25	36	41	40	44	51	46	40	37	
Mar.	28	40	39	45	57	60	54	48	42	
Apr.	25	53	51	57	73	85	85	66	61	
May	26	52	52	66	75	77	74	68	63	
June	24	61	58	75	87	98	97	81	77	
July	20	69	61	78	91	97	98	88	73	
Aug.	5	69	54	70	88	98	98	86	71	
Sept.	25	59	58	63	79	91	89	73	64	
Oct.	2	42	50	53	79	82	70	65	56	
Nov.	21	57	54	56	62	67	55	35	27	
Dec.	21	32	30	51	55	57	48	38	34	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	-32	-31	-34	-26	-17	-22	-21	-22	
Feb.	2	2	-02	0	3	6	7	6	2	
Mar.	22	8	4	7	16	20	19	10	3	
Apr.	15	31	29	38	55	67	69	49	45	
May	15	35	34	38	39	46	42	39	40	
June	1	42	38	54	64	70	71	60	55	
July	13	48	46	67	75	85	85	75	65	
Aug.	31	44	42	51	54	50	53	47	40	
Sept.	30	27	23	32	46	50	45	39	34	
Oct.	6	21	18	29	49	60	60	42	42	
Nov.	29	9	6	4	16	26	23	15	8	
Dec.	24	-15	-16	-15	3	26	26	28	30	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: HAVRE, MONTANA

YEAR: 1975

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	23	38	41	40	47	49	48	39	40	
Feb.	23	34	35	36	45	48	46	46	41	
Mar.	18	40	39	41	52	52	52	46	40	
Apr.	21	32	28	43	53	58	57	48	43	
May	15	50	48	56	71	81	83	64	61	
June	24	58	55	66	77	84	87	74	67	
July	27	61	56	76	98	104	105	88	77	
Aug.	6	60	57	71	84	91	92	79	71	
Sept.	15	51	47	61	77	87	85	65	60	
Oct.	2	47	42	51	70	82	79	53	50	
Nov.	5	38	35	38	63	77	58	52	48	
Dec.	4	49	50	50	51	56	23	15	14	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	10	-10	-14	-18	-15	-14	-17	-20	-15	
Feb.	4	-13	-10	-16	-09	-06	-09	-16	-20	
Mar.	12	-05	-06	0	15	28	32	19	13	
Apr.	6	-14	-06	-04	4	13	15	15	15	
May	1	35	33	44	47	50	52	45	41	
June	2	36	44	60	75	82	82	70	66	
July	17	55	52	67	79	81	80	72	65	
Aug.	9	48	44	61	73	78	81	66	59	
Sept.	20	34	31	35	44	45	44	40	36	
Oct.	28	21	19	22	33	49	44	36	33	
Nov.	30	-18	-20	-19	-09	-06	-04	-03	1	
Dec.	14	-23	-22	-20	-13	-04	29	28	25	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: HAVRE, MONTANA

YEAR: 1970

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	31	39	38	43	49	59	49	40	37	
Feb.	23	36	49	48	57	63	53	40	37	
Mar.	31	36	34	40	65	73	74	54	50	
Apr.	12	62	47	52	70	78	79	64	60	
May	27	44	43	63	77	85	86	74	75	
June	30	61	58	71	85	95	94	83	76	
July	26	69	66	77	92	98	97	83	72	
Aug.	22	56	53	66	90	100	97	81	76	
Sept.	1	54	51	61	79	95	94	71	69	
Oct.	10	52	51	53	73	80	76	64	46	
Nov.	4	39	44	49	63	73	64	46	39	
Dec.	17	45	40	40	53	60	45	42	33	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	7	-10	-13	-14	-14	-10	-17	-23	-22	
Feb.	5	-01	0	-01	8	16	18	13	16	
Mar.	3	-20	-23	-22	-07	0	2	-09	-15	
Apr.	3	26	21	29	48	60	59	41	39	
May	3	32	30	42	59	70	73	63	52	
June	4	47	42	48	53	61	67	61	55	
July	15	50	47	60	68	76	78	70	61	
Aug.	27	49	46	56	67	72	71	61	54	
Sept.	27	34	29	35	56	72	72	55	44	
Oct.	23	24	22	19	25	30	27	22	18	
Nov.	27	-08	-07	-11	2	9	8	0	-01	
Dec.	10	6	-03	13	33	38	35	35	39	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: HAVRE, MONTANA

YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	6	28	31	33	35	36	36	32	31	
Feb.	21	39	45	42	52	59	52	37	35	
Mar.	23	25	19	26	50	70	69	62	47	
Apr.	25	44	40	58	74	85	81	60	55	
May		50	48	58	73	84	83	72	63	
June	25	64	55	75	85	93	93	80	70	
July	23	70	67	80	92	99	96	88	77	
Aug.	18	58	49	61	85	92	93	76	70	
Sept.	4	48	53	55	75	84	81	72	62	
Oct.	18	43	38	41	63	77	70	53	47	
Nov.	10	30	31	45	54	60	47	39	33	
Dec.	14	40	39	41	41	42	37	35	36	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	15	-18	-21	-20	-14	-10	-11	-13	-10	
Feb.	1	-01	-01	18	20	31	30	25	17	
Mar.	30	1	0	6	20	29	24	6	7	
Apr.	3	-01	-02	8	31	37	38	38	37	
May	6	31	29	46	62	71	70	59	59	
June	30	47	42	63	72	78	82	74	64	
July	20	55	40	63	77	80	83	74	65	
Aug.	30	43	38	47	55	61	60	53	49	
Sept.	27	34	34	43	61	67	65	54	52	
Oct.	11	22	23	26	46	52	57	43	40	
Nov.	21	-15	-19	-23	-06	4	-02	-08	-12	
Dec.	8	-22	-24	-23	-21	-20	-29	-31	-36	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: HAVRE, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	22	24	32	22	30	37	35	32	33	
Feb.	23	29	37	42	43	43	41	39	38	
Mar.	29	37	34	38	63	69	66	55	53	
Apr.	25	46	42	50	62	68	70	62	55	
May	21	54	51	67	74	80	79	69	60	
June	28	55	50	71	84	86	92	79	74	
July	24	65	60	79	96	100	99	83	67	
Aug.	10	63	59	77	92	97	96	79	69	
Sept.	4	63	56	65	90	97	95	75	71	
Oct.	9	36	36	40	62	75	73	55	50	
Nov.	7	53	55	58	68	70	65	64	60	
Dec.	11	13	35	42	40	40	38	37	34	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	30	-20	-19	-22	-12	-05	-09	-12	-14	
Feb.	16	-14	-17	-16	-08	-03	-04	-10	-04	
Mar.	3	-24	-26	-26	-13	-02	0	-10	-13	
Apr.	13	25	25	35	48	49	53	48	41	
May	25	44	39	56	63	63	60	53	47	
June	20	42	42	58	67	71	73	65	56	
July	19	44	44	56	66	72	66	64	54	
Aug.	3	45	41	55	69	72	79	70	57	
Sept.	18	37	38	42	47	49	46	45	44	
Oct.	22	27	23	25	45	53	48	42	44	
Nov.	21	-17	-18	-18	-14	-09	-10	-12	-13	
Dec.	30	-28	-28	-28	-26	-19	-21	-19	-24	

TABLE NO. 5A

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: HAVRE, MONTANAYEAR: AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	20	34	37	36	42	46	43	37	37	
Feb.	23	35	41	42	48	53	48	32	38	
Mar.	26	36	33	38	57	65	63	52	46	
Apr.	22	47	42	52	66	71	74	59	55	
May	20	50	48	62	74	81	81	68	64	
June	26	60	55	72	84	91	93	79	73	
July	24	67	62	78	94	100	99	86	73	
Aug.	12	61	54	69	88	96	95	80	71	
Sept.	10	55	53	61	80	91	89	71	65	
Oct.	8	44	43	48	69	79	74	58	50	
Nov.	9	43	44	49	62	69	58	47	41	
Dec.	13	36	39	45	48	51	38	33	30	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	15	-18	-20	-22	-16	-11	-15	-18	-17	
Feb.	6	-05	-06	-03	3	9	8	4	2	
Mar.	14	-08	-10	-07	6	15	15	3	-01	
Apr.	8	13	13	21	36	45	47	38	35	
May	10	35	33	45	54	60	59	52	48	
June	11	43	42	57	66	72	75	66	59	
July	17	50	46	63	73	79	78	71	62	
Aug.	20	46	42	54	64	67	69	59	52	
Sept.	24	33	31	37	51	57	54	47	42	
Oct.	18	23	21	24	40	49	47	37	35	
Nov.	26	-10	-12	-13	-02	5	3	-02	-03	
Dec.	17	-16	-19	-15	-05	4	8	8	7	

TABLE NO. 5 - B

LOCATION HAVRE, MONTANA YEAR 1974

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	13	27	26	41	44	56	61	56	45	38	29	26	38.5
04	14	26	23	38	42	53	58	53	42	35	28	24	36.3
07	14	26	26	44	49	65	71	60	49	40	28	25	41.4
10	18	32	35	53	56	75	81	68	62	55	40	33	50.7
13	20	37	40	58	59	80	87	73	68	63	47	39	55.9
16	17	35	38	58	59	79	86	73	67	59	40	33	53.7
19	15	30	31	49	52	69	77	63	55	46	33	28	45.7
22	13	29	28	45	46	62	66	58	49	42	30	27	41.3
Ave 01 - 22	13.9	29.8	31.3	48.3	50.8	67.3	73.1	63.6	55.0	47.7	34.3	29.1	45.4
Ave 19 - 04	13.8	28	27	43.3	46	60	65.5	57.5	47.8	40.3	30	26.3	40.5
Ave 07 - 16	17.3	32.5	34.8	53.3	55.8	74.8	81.3	68.5	61.5	54.3	38.8	32.5	50.4
Ave 19 - 07	13.8	27.6	26.8	43.4	46.6	61	66.6	58	48	40.2	29.6	26	40.6
Ave 10 - 16	18.3	34.7	37.7	56.3	58	78	84.7	71.3	65.7	59	42.3	35	53.4

TABLE NO. 5 - B

LOCATION HAVRE, MONTANA YEAR 1975

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	18	7	21	29	46	54	63	56	46	39	26	23	35.7
04	17	6	20	28	44	51	60	54	45	37	25	22	34.1
07	16	5	21	31	52	60	70	60	50	40	27	21	37.8
10	23	16	30	37	59	68	81	71	63	50	35	26	46.7
13	29	22	34	41	62	70	86	76	70	54	40	30	51.2
16	25	20	33	41	61	70	85	75	69	52	34	27	49.3
19	19	12	26	35	55	63	75	65	56	44	28	24	41.8
22	18	10	23	32	49	56	66	58	51	41	26	23	37.8
Ave 01 - 22	20.0	11.2	25.6	33.7	53.3	60.8	73.1	65.2	56.5	45.6	29.9	24.7	41.8
Ave 19 - 04	18	8.8	22.5	31	48.5	56.0	66.0	58.3	49.5	40.3	26.3	23	37.4
Ave 07 - 16	23.3	15.8	29.5	37.5	58.5	67.0	80.5	70.5	63.0	49.3	34.3	26.0	46.3
Ave 19 - 07	17.6	8.0	22.2	31	49.2	56.8	66.8	58.6	49.6	40.2	26.4	22.6	37.4
Ave 10 - 16	25.7	19.3	32.3	39.7	60.7	69.3	84.0	74.0	67.3	52.3	36.7	27.7	49.1

TABLE NO. 5 - B

LOCATION HAVRE, MONTANA YEAR 1976

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	19	29	25	41	49	55	61	60	49	34	24	25	39.3
04	18	28	23	38	45	52	58	57	47	34	23	23	37.2
07	18	28	24	43	56	59	70	66	55	37	24	23	41.9
10	24	35	35	55	66	66	79	79	70	50	36	30	52.1
13	29	40	41	60	71	70	84	83	77	57	42	33	57.3
16	27	38	41	60	70	71	85	82	77	54	37	29	55.9
19	23	31	31	49	61	65	75	71	61	44	28	27	47.2
22	22	30	27	45	53	58	66	64	56	38	24	27	42.5
Ave 01 - 22	22.5	33.1	30.8	48.5	57.9	62.0	71.7	70.6	61.3	43.6	30.2	26.7	46.7
Ave 19 - 04	20.5	29.5	26.5	43.3	52.0	57.5	65.0	63.0	53.3	37.5	24.8	25.5	41.5
Ave 07 - 16	24.5	35.3	35.3	54.5	65.8	66.5	79.5	77.5	69.8	49.5	34.8	28.8	51.8
Ave 19 - 07	20.0	29.2	26.0	43.2	52.8	57.8	66.0	63.6	53.6	37.4	24.6	25.0	41.6
Ave 10 - 16	26.7	37.7	39.0	58.3	69.0	69.0	82.7	81.3	74.7	53.7	38.3	30.7	55.1

TABLE NO. 5 - B

LOCATION HAVRE, MONTANA YEAR 1977

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	8	28	27	38	47	57	60	54	48	39	22	12	36.7
04	6	28	26	34	45	54	57	51	46	37	23	12	34.9
07	7	29	29	44	54	64	68	59	51	39	23	11	39.8
10	10	37	40	55	62	73	79	70	63	52	33	15	49.1
13	15	43	46	62	66	78	83	74	68	59	37	17	54.0
16	13	41	45	61	66	78	82	75	68	55	31	14	52.4
19	11	33	34	49	57	70	74	65	57	45	26	12	44.4
22	10	30	30	43	52	62	65	59	51	42	24	11	39.9
Ave 01 - 22	9.6	34.1	34.8	47.4	56.4	66.6	70.2	63.6	57.3	47.6	27.4	12.1	43.9
Ave 19 - 04	8.8	29.8	29.3	41.0	50.3	60.8	64.0	57.3	50.5	40.8	23.8	11.8	39.0
Ave 07 - 16	11.3	37.5	40.0	55.5	62.0	73.3	78.0	69.5	62.5	51.3	31.0	14.3	48.9
Ave 19 - 07	8.4	29.6	29.2	41.6	51.0	61.4	64.8	57.6	50.6	40.4	23.6	11.6	39.2
Ave 10 - 16	12.7	40.3	43.7	59.3	64.7	76.3	81.3	73.0	66.3	55.3	33.7	15.3	51.8

TABLE NO. 5 - B				LOCATION <u>HAVRE, MONTANA</u>								YEAR <u>1978</u>			
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	2	10	25	41	49	53	58	57	51	39	19	11	34.6		
04	2	10	24	40	46	51	55	52	49	38	20	11	33.2		
07	2	10	26	42	53	62	66	62	54	40	20	11	37.3		
10	5	15	32	49	60	71	76	75	65	53	25	16	45.2		
13	8	18	36	52	64	75	80	80	70	60	28	18	49.1		
16	6	17	36	53	63	75	79	80	70	57	25	15	48.0		
19	2	14	31	47	57	65	70	69	59	46	22	13	41.3		
22	2	13	29	44	51	58	62	61	55	42	19	12	37.3		
Ave 01 - 22	2.5	12.2	29.1	46.6	55.6	63.9	67.9	66.7	59.3	47.4	21.1	12.4	40.8		
Ave 19 - 04	2.0	11.8	27.3	43.0	50.8	56.8	61.3	59.8	53.5	41.3	20.0	11.8	36.6		
Ave 07 - 16	5.3	15.0	32.5	49.0	60.0	70.8	75.3	74.3	64.8	52.5	24.5	15.0	44.9		
Ave 19 - 07	2.0	11.4	27.0	42.8	51.2	57.8	62.2	60.2	53.6	41.0	20.0	11.6	36.7		
Ave 10 - 16	6.3	16.7	34.7	51.3	62.3	73.7	78.3	78.3	68.3	56.7	26.0	16.3	47.4		

TABLE NO. 5 - B													YEAR	
AVERAGE MONTHLY TEMPERATURE FOR THE MONTH - 3 HOUR INCREMENTS														
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave	
01														
04														
07														
10														
13														
16														
19														
22														
Ave 01 - 22														
Ave 19 - 04														
Ave 07 - 16														
Ave 19 - 07														
Ave 10 - 16														

TABLE NO. 5 - C - 1								LOCATION <u>HAVRE, MONTANA</u>						
								FIVE YEARS <u>1974-1978</u>						
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 04	1974	13.8	28.0	27.0	43.3	46.0	60.0	65.5	57.5	47.8	40.3	30.0	26.3	40.5
	1975	18.0	8.8	22.5	31.0	48.5	56.0	66.0	58.3	49.5	40.3	26.3	23.0	37.4
	1976	20.5	29.5	26.5	43.3	52.0	57.5	65.0	63.0	53.3	37.5	24.8	25.5	41.5
	1977	8.8	29.8	29.3	41.0	50.3	60.8	64.0	57.3	50.5	40.8	23.8	11.8	39.0
	1978	2.0	11.8	27.3	43.0	50.8	56.8	61.3	59.8	53.5	41.3	20.0	11.8	36.6
5-Yr. Ave		12.6	21.6	26.5	40.3	49.5	58.2	64.4	59.2	50.9	40.0	25.0	19.7	39.0
Day 07 - 16	1974	17.3	32.5	34.8	53.3	55.8	74.8	81.3	68.5	61.5	54.3	38.8	32.5	50.4
	1975	23.3	15.8	29.5	37.5	58.5	67.0	80.5	70.5	63.0	49.3	34.3	26.0	46.3
	1976	24.5	35.3	35.3	54.5	65.8	66.5	79.5	77.5	69.8	49.5	34.8	28.8	51.8
	1977	11.3	37.5	40.0	55.5	62.0	73.3	78.0	69.5	62.5	51.3	31.0	14.3	48.9
	1978	5.3	15.0	32.5	42.0	60.0	70.8	75.3	74.3	64.8	52.5	24.5	15.0	44.9
5-Yr. Ave		16.3	27.2	34.4	50.0	60.4	70.5	78.9	72.1	64.3	51.4	32.7	23.3	48.5
Day/Night Dif.		3.7	5.6	7.9	9.7	10.9	12.3	14.5	12.9	13.4	11.4	7.7	3.6	9.5

TABLE NO. 5 - C - 2								LOCATION <u>HAVRE, MONTANA</u>						
								FIVE YEARS <u>1974-1978</u>						
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 07	1974	13.8	27.6	26.8	43.4	46.6	61.0	66.6	58.0	48.0	40.2	29.6	26.0	40.6
	1975	17.6	8.0	22.2	31.0	49.2	56.8	66.8	58.6	49.6	40.2	26.4	22.6	37.4
	1976	20.0	29.2	26.0	43.2	52.8	57.8	66.0	63.6	53.6	37.4	24.6	25.0	41.6
	1977	8.4	29.6	29.2	41.6	51.0	61.4	64.8	57.6	50.6	40.4	23.6	11.6	39.2
	1978	2.0	11.4	27.0	42.8	51.2	57.8	62.2	60.2	53.6	41.0	20.0	11.6	36.7
5-Yr. Ave		12.4	21.2	26.2	40.4	50.2	59.0	65.3	59.6	51.1	39.8	24.8	19.4	39.1
Day 10 - 16	1974	18.3	34.7	37.7	56.3	58.0	78.0	84.7	71.3	65.7	59.0	42.3	35.0	53.4
	1975	25.7	19.3	32.3	39.7	60.7	69.3	84.0	74.0	67.3	52.3	36.7	27.7	49.1
	1976	26.7	37.7	39.0	58.3	69.0	69.0	82.7	81.3	74.7	53.7	38.3	30.7	55.1
	1977	12.7	40.3	43.7	59.3	64.7	76.3	81.3	73.0	66.3	55.3	33.7	15.3	51.8
	1978	6.3	16.7	34.7	51.3	62.3	73.7	78.3	78.3	68.3	56.7	26.0	16.3	47.4
5-Yr. Ave		17.9	29.7	37.5	53.0	62.9	73.3	82.2	75.6	68.5	55.4	35.4	25.0	51.4
Day/Night Dif.		5.5	8.5	11.3	12.6	12.7	14.3	16.9	16.0	17.4	15.6	10.6	5.6	12.3

TABLE NO. 5 - C - 3

LOCATION HAVRE, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	13.9	29.8	31.3	48.3	50.8	67.3	73.1	63.6	55.0	47.7	34.3	29.1	45.4	1.041
1975	20.0	11.2	25.6	33.7	53.3	60.8	73.1	65.2	56.5	45.6	29.9	24.7	41.6	.954
1976	22.5	33.1	30.8	48.5	57.9	62.0	71.7	70.6	61.3	43.6	30.2	26.7	46.6	1.069
1977	9.6	34.1	34.8	47.4	56.4	66.6	70.2	63.6	57.3	47.6	27.4	12.1	43.9	.101
1978	2.5	12.2	29.1	46.6	55.6	63.9	67.9	66.7	59.3	47.4	21.1	12.4	40.4	.927
5-Yr. Ave.	13.7	24.1	30.3	44.9	54.8	64.1	71.2	65.9	57.9	46.4	28.6	21	43.6	1.000

MONTHLY WET BULB TEMPERATURE

LOCATION HAVRE, MONTANA

MONTH June 1974

INTERIOR DESIGN CONDITIONS 78^odb 65^owb

[illegible]

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summerized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH												
LOCATION HAVRE, MONTANA YEAR 1974-1978												
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May												
Ju	48	66.3	9	67.0	15	66.6	15	66.0	18	66.2	21.0	66.3
Jul	60	66.3	129	68.6	60	66.7	21	65.9	42	66.2	62.4	67.3
Aug			18	65.8	51	65.7			6	65.5	15.0	65.7
Sep									9	65.7	1.8	65.7
Oct												
Nov												
Dec												
Total	108	66.3	156	68.2	126	66.3	36	65.9	75	66.1	100.2	66.8
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

TABLE NO. 6						Location
PERCENT OF SUNSHINE - MONTHLY AVERAGE						HAVRE, MONTANA
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	45	34	49	38	46	42.4
Feb.	68	44	60	70	52	58.8
Mar.	83	51	87	77	78	75.2
Apr.	78	46	86	87	64	72.2
May	72	71	88	73	73	75.4
Jun.	87	74	78	81	86	81.2
Jul.	90	81	88	71	82	82.4
Aug.	76	77	88	60	87	77.6
Sept.	78	82	89	57	77	76.6
Oct.	79	41	66	65	71	64.4
Nov.	56	45	62	44	52	51.8
Dec.	41	32	31	32	36	34.4
Yearly	71.1	56.5	72.7	62.9	67.0	66.03

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

HAVRE, MONTANA		48° N.L. P= 1.05		Single Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	232	6	16.7	48	20,713
Feb	260	7	23.1	60	30,576
Mar	266	7	31.7	70	40,405
Apr	251	7	49.7	68	35,843
May	232	7	61.3	71	35,744
Jun	223	7	68.2	74	34,654
Jul	227	7	77.5	84	41,378
Aug	242	7	75.7	81	42,536
Sep	254	7	64.3	73	38,938
Oct	247	7	53.7	64	34,303
Nov	245	5	35.9	49	18,008
Dec	227	5	23.6	43	15,130

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

<div> <div>HAVRE, MONTANA</div> <div> 48° N.L. $P = 1.05$ </div> <div>Double Glazed Collector</div> </div>					
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	220	6	16.7	48	19,642
Feb	247	7	23.1	60	29,047
Mar	252	7	31.7	70	38,279
Apr	238	7	49.7	68	33,986
May	220	7	61.3	71	33,895
Jun	212	7	68.2	74	32,945
Jul	215	7	77.5	84	39,190
Aug	230	7	75.7	81	40,427
Sep	241	7	64.3	73	36,945
Oct	234	7	53.7	64	32,498
Nov	232	5	35.9	49	17,052
Dec	215	5	23.6	43	14,330

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

HAVRE, MONTANA		48° N.L. P= 1.05		Concentrating Collector		
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	250	5	16.7	48	600	18,600
Feb	284	7	23.1	60	1193	33,398
Mar	289	11	31.7	70	2225	68,984
Apr	268	11	49.7	68	2005	60,139
May	256	11	61.3	71	1999	61,980
Jun	247	11	68.2	74	2011	60,317
Jul	248	11	77.5	84	2292	71,037
Aug	259	10	75.7	81	2098	65,035
Sep	269	9	64.3	73	1767	53,020
Oct	267	7	53.7	64	1196	37,081
Nov	244	5	35.9	49	598	17,934
Dec	224	5	23.6	43	482	14,930
					AV MO	46,871

HELENA WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded at Helena recording station.

TABLE NO. 1

Un

HELENA, MONTANA

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	28.8	5.8		8760	562,096.8
-19			11.5	2.9	8754.2	553,351.2
-18			17.3	11.5	8748.5	544,605.6
-17			23.0	25.9	8742.7	535,860.0
-16			28.8	46.1	8737.0	527,114.4
-15	-15 thru -11 -12½	40.2	36.8	72.0	8731.2	518,368.8
-14			44.9	120.9	8723.2	509,657.7
-13			52.9	169.8	8715.1	500,946.6
-12			61.0	218.7	8707.1	492,235.5
-11			69.0	267.6	8699.0	483,524.4
-10	-10 thru -6 -7½	61.2	81.2	316.5	8691.0	474,813.3
-9			93.5	416.1	8678.8	466,152.9
-8			105.7	515.7	8666.5	457,492.5
-7			118.0	615.3	8654.3	448,832.1
-6			130.2	714.9	8642.0	440,171.7
-5	- 5 thru -1 -2½	81	146.4	814.5	8629.8	431,511.3
-4			162.6	985.2	8613.6	422,922.0
-3			178.8	1,155.9	8597.4	414,332.7
-2			195.0	1,326.6	8581.2	405,743.4
-1			211.2	1,497.3	8565.0	397,154.1
0	0 thru 4 2½	99	231.0	1,758.0	8548.8	388,564.8
1			250.8	2,018.7	8529.0	380,065.5
2			270.6	2,279.4	8509.2	371,566.2
3			290.4	2,540.1	8489.4	363,066.9
4			310.2	2,800.8	8469.6	354,567.6
5	5 thru 9 7½	154.8	341.2	3,061.5	8449.8	346,068.3
6			372.1	3,449.1	8418.8	337,695.9
7			403.1	3,836.7	8387.9	329,323.5
8			434.0	4,224.3	8356.9	320,951.1
9			465.0	4,611.9	8326.0	312,578.7
10	10 thru 14 12½	213.6	507.7	4,999.5	8295.0	304,206.3
11			550.4	5,571.3	8252.3	296,018.1
12			593.2	6,143.1	8209.6	287,829.9
13			635.9	6,714.9	8166.8	279,641.7
14			678.6	7,286.7	8124.1	271,453.5
15	15 thru 19 17½	327	744.0	7,858.5	8081.4	263,265.3
16			809.4	8,700.6	8016.0	255,347.4
17			874.8	9,542.7	7950.6	247,429.5
18			940.2	10,384.8	7885.2	239,511.6
19			1005.6	11,226.9	7819.8	231,593.7
20	20 thru 24 22½	406.2	1086.8	12,069.0	7754.4	223,675.8
21			1168.1	13,277.7	7673.2	215,961.0
22			1249.3	14,486.4	7591.9	208,246.2
23			1330.6	15,695.1	7510.7	200,531.4
24			1411.8	16,903.8	7429.4	192,816.6
25	25 thru 29 27½	514.2	1514.6	18,112.5	7348.2	185,101.8
26			1617.5	19,781.4	7245.4	178,010.7
27			1720.3	21,450.3	7142.5	170,919.6
28			1823.2	23,119.2	7039.7	163,828.5
29			1926.0	24,788.1	6936.8	156,737.4
30	30 thru 34 32½	808.2	2087.6	26,457.0	6834.0	149,646.3
31			2249.3	28,787.1	6672.4	143,216.4
32			2410.9	31,117.2	6510.7	136,786.5
33			2572.6	33,447.3	6349.1	130,356.6
34			2734.2	35,777.4	6187.4	123,926.7
35	35 thru 39 37½	903	2914.8	38,107.5	6025.8	117,496.8
36			3095.4	41,293.2	5845.2	111,922.5
37			3276.0	44,478.9	5664.6	106,348.2
38			3456.6	47,664.6	5484.0	100,773.9
39			3637.2	50,850.3	5303.4	95,199.6

DEGREE HOUR TABLE NO. 1B
5-Year Average 1974 - 1978

T E M P. E R E D E G R E E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No.of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	856.2	3808.4	54,036.0	5122.8	89,625.3
41			3979.7	58,101.3	4951.6	84,930.6
42			4150.9	62,166.6	4780.3	80,235.9
43			4322.2	66,231.9	4609.1	75,541.2
44			4493.4	70,297.2	4437.8	70,846.5
45	45 thru 49 47½	810	4655.4	74,362.5	4266.6	66,151.8
46			4817.4	79,260.9	4104.6	62,290.2
47			4979.4	84,159.3	3942.6	58,428.6
48			5141.4	89,057.7	3780.6	54,567.0
49			5303.4	93,956.1	3618.6	50,705.4
50	50 thru 54 52½	796.8	5462.8	98,854.5	3456.6	46,843.8
51			5622.1	104,556.3	3297.2	43,785.6
52			5781.5	110,258.1	3137.9	40,727.4
53			5940.8	115,959.9	2978.5	37,669.2
54			6100.2	121,661.7	2819.2	34,611.0
55	55 thru 59 57½	729	6246.0	127,363.5	2659.8	31,552.8
56			6391.8	133,828.2	2514.0	29,257.5
57			6537.6	140,292.9	2368.2	26,962.2
58			6683.4	146,757.6	2222.4	24,666.9
59			6829.2	153,222.3	2076.6	22,371.6
60	60 thru 64 62½	626.4	6954.5	159,687.0	1930.8	20,076.3
61			7079.8	166,829.4	1805.5	18,458.7
62			7205.0	173,971.8	1680.2	16,841.1
63			7330.3	181,114.2	1555.0	15,223.5
64			7455.6	188,256.6	1429.7	13,605.9
65	65 thru 69 67½	477.6	7551.1	195,399.0	1304.4	11,988.3
66			7646.6	203,093.4	1208.9	10,922.7
67			7742.2	210,787.8	1113.4	9,857.1
68			7837.7	218,482.2	1017.8	8,791.5
69			7933.2	226,176.6	922.3	7,725.9
70	70 thru 74 72½	309	7995.0	233,871.0	826.8	6,660.3
71			8056.8	241,958.7	765.0	5,988.0
72			8118.6	250,046.4	703.2	5,315.7
73			8180.4	258,134.1	641.4	4,643.4
74			8242.2	266,221.8	579.6	3,971.1
75	75 thru 79 77½	260.4	8294.3	274,309.5	517.8	3,298.8
76			8346.4	282,681.9	465.7	2,911.2
77			8398.4	291,054.3	413.6	2,523.6
78			8450.5	299,426.7	361.6	2,136.0
79			8502.6	307,799.1	309.5	1,748.4
80	80 thru 84 82½	142.2	8531.0	316,171.5	357.4	1,360.8
81			8559.5	324,745.2	229.0	1,174.5
82			8587.9	333,318.9	200.5	988.2
83			8616.4	341,892.6	172.1	801.9
84			8644.8	350,466.3	143.6	615.6
85	85 thru 89 87½	88.2	8662.4	359,040.0	115.2	429.3
86			8680.1	367,728.9	97.6	358.2
87			8697.7	376,417.8	79.9	287.1
88			8715.4	385,106.7	62.3	216.0
89			8733.0	393,795.6	44.6	144.9
90	90 thru 94 92½	25.2	8738.0	402,484.5	27.0	73.8
91			8743.1	411,230.1	22.0	59.4
92			8748.1	419,975.7	16.9	45.0
93			8753.2	428,721.3	11.9	30.6
94			8758.2	437,466.9	6.8	16.2
95	95 thru 99 97½	1.8	8759.1	446,212.5	1.8	1.8
96			8760.0	454,971.6	0.9	.5
97						
98						
99						

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: HELENA, MONTANAYEAR: 1974Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	15	45	47	56	57	58	53	56	54	
Feb.	28	34	32	38	42	52	50	50	48	
Mar.	27	37	35	36	52	60	61	45	44	
Apr.	25	48	44	51	74	78	75	61	56	
May	5	43	38	48	64	73	75	62	53	
June	30	61	52	69	80	87	92	81	71	
July	14	65	58	70	77	88	95	85	79	
Aug.	5	59	56	65	79	88	92	80	73	
Sept.	25	42	38	47	62	82	81	63	70	
Oct.	16	48	41	42	62	77	75	55	46	
Nov.	21	53	54	53	59	59	55	55	50	
Dec.	21	31	35	49	48	53	35	28	27	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	5	-13	-19	-22	-20	-17	-22	-22	-23	
Feb.	7	22	16	7	16	26	30	30	29	
Mar.	20	8	4	8	17	33	33	30	31	
Apr.	1	24	29	33	41	47	43	35	35	
May	15	35	34	37	43	44	45	40	38	
June	1	40	37	46	59	68	70	63	54	
July	12	48	49	59	67	76	80	73	60	
Aug.	21	47	42	49	59	69	70	61	52	
Sept.	13	31	27	36	51	60	64	51	44	
Oct.	6	23	21	21	38	54	58	49	44	
Nov.	30	15	15	13	21	30	30	23	19	
Dec.	24	7	6	6	10	18	22	24	28	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: HELENA, MONTANA

YEAR: 1975

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	17	40	36	45	45	48	46	41	43	
Feb.	27	35	33	33	36	40	41	34	33	
Mar.	30	38	41	44	46	47	38	28	25	
Apr.	24	34	30	39	55	60	56	50	44	
May	14	45	38	47	50	74	77	65	54	
June	24	51	49	58	69	79	82	77	61	
July	27	62	55	64	78	91	95	85	70	
Aug.	6	60	53	63	74	85	87	75	69	
Sept.	15	48	43	51	67	80	80	67	58	
Oct.	5	43	42	44	58	76	77	63	49	
Nov.	3	54	53	51	57	65	61	46	38	
Dec.	4	51	52	51	55	58	54	40	33	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	31	-16	-17	-16	-14	-04	-04	-06	-14	
Feb.	6	-20	-20	-23	-13	-04	-05	-05	-05	
Mar.	28	12	10	7	16	20	20	18	20	
Apr.	1	10	10	9	14	19	26	23	23	
May	1	28	26	33	44	53	52	46	38	
June	10	37	35	45	58	65	67	60	49	
July	18	50	48	59	71	77	75	72	63	
Aug.	29	45	39	46	57	65	70	55	49	
Sept.	19	37	32	33	47	56	57	47	40	
Oct.	24	24	23	25	32	37	33	32	26	
Nov.	30	-10	-08	-03	6	10	12	15	17	
Dec.	4	-04	-05	-04	7	17	17	17	11	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: HELENA, MONTANA

YEAR: 1976

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	16	43	46	48	50	52	52	48	40	
Feb.	23	25	25	24	49	57	56	38	32	
Mar.	31	29	26	33	50	62	64	56	50	
Apr.	6	38	34	39	57	70	71	58	50	
May	13	51	48	50	68	80	82	75	64	
June	30	59	57	60	76	94	92	76	74	
July	23	57	53	65	79	92	93	82	66	
Aug.	14	55	51	56	67	80	87	75	66	
Sept.	5	54	49	57	71	89	92	78	67	
Oct.	1	47	42	50	61	72	75	62	57	
Nov.	17	44	51	38	48	63	61	60	52	
Dec.	26	35	38	42	51	56	50	40	42	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	7	-07	-07	-07	-06	-02	-02	-01	-01	
Feb.	5	-01	-05	-08	02	11	13	05	01	
Mar.	3	-14	-20	-17	-05	03	07	05	-04	
Apr.	3	30	22	30	45	54	58	45	38	
May	15	34	33	43	52	59	61	53	46	
June	28	44	37	55	68	77	82	68	62	
July	14	51	46	58	73	77	79	66	56	
Aug.	27	48	43	53	61	68	72	60	60	
Sept.	9	37	35	42	56	69	73	55	48	
Oct.	19	24	21	22	39	50	52	45	33	
Nov.	26	20	18	13	15	17	11	8	13	
Dec.	31	23	22	23	21	21	13	9	7	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: HELENA, MONTANA

YEAR: 1977

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	17	23	24	40	41	45	46	47	37	
Feb.	17	40	44	39	52	55	51	48	45	
Mar.	23	30	29	32	48	62	62	43	45	
Apr.	25	49	42	49	64	78	80	63	54	
May	31	53	43	55	66	80	81	71	62	
June	25	60	55	66	84	88	88	80	73	
July	16	58	57	66	79	89	90	80	70	
Aug.	19	63	61	70	76	87	90	77	74	
Sept.	6	58	54	58	72	82	85	72	65	
Oct.	16	38	34	37	55	69	65	53	51	
Nov.	2		54	45	48	49	43	39	35	
Dec.	3	43	47	41	46	51	44	45	37	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	5	-08	-14	-15	-04	2	2	1	5	
Feb.	4	19	18	16	24	35	36	29	23	
Mar.	20	13	6	9	21	31	34	31	29	
Apr.	3	20	19	22	38	44	47	47	45	
May	19	39	33	38	47	48	48	46	39	
June	17	48	44	54	63	68	73	66	56	
July	11	46	44	53	67	74	75	69	60	
Aug.	31	44	38	44	55	62	61	58	53	
Sept.	25	43	30	39	47	57	58	50	47	
Oct.	10	32	29	30	38	45	47	38	34	
Nov.	21	-07	-11	-09	01	10	11	12	09	
Dec.	31	0	-02	-12	-6	-01	-11	-14	-17	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: HELENA, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	25	34	35	37	40	39	34	41	41	
Feb.	23	33	28	27	36	44	50	42	39	
Mar.	29	44	38	45	58	72	75	63	53	
Apr.	25	48	46	53	63	67	65	60	57	
May	14	53	49	57	81	83	81	70	61	
June	28	57	52	65	75	90	90	84	69	
July	27	67	65	70	85	91	91	78	67	
Aug.	10	68	59	66	86	92	91	76	70	
Sept.	2	53	47	58	71	88	92	73	67	
Oct.	8	52	50	51	66	70	70	55	47	
Nov.	7	38	37	41	50	63	62	52	60	
Dec.	4	45	42	39	39	39	36	31	24	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	2	-20	-19	-21	-16	-07	-10	-12	-08	
Feb.	13	-05	-06	-11	-02	5	6	-03	-03	
Mar.	3	-03	-04	-08	2	8	9	9	9	
Apr.	13	33	28	35	46	53	55	44	41	
May	5	40	39	41	41	43	45	45	45	
June	2	42	40	49	62	70	74	67	59	
July	4	50	48	54	55	64	65	60	55	
Aug.	18	46	44	53	62	68	71	61	53	
Sept.	20	36	31	36	51	60	61	48	45	
Oct.	31	21	18	21	35	45	43	29	25	
Nov.	21	-06	-03	-05	-02	3	3	3	3	
Dec.	29	-12	-22	-23	-20	-14	-14	-20	-22	

TABLE NO. 5A

M O N T H L Y E X T R E M E T E M P E R A T U R E
W A R M E S T A N D C O L D E S T D A Y O F M O N T H

L O C A T I O N : HELENA, MONTANAY E A R : AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	18	37	37	45	47	48	46	47	43	
Feb.	24	33	32	32	43	50	50	42	39	
Mar.	28	36	34	38	51	61	60	47	43	
Apr.	21	43	39	46	63	71	69	58	52	
May	15	49	43	51	68	78	79	69	59	
June	27	58	54	64	77	88	89	80	70	
July	21	62	58	67	80	90	93	82	56	
Aug.	11	61	56	64	76	86	89	76	70	
Sept.	10	51	46	53	65	84	86	71	65	
Oct.	9	46	42	45	60	73	72	58	50	
Nov.	16	49	50	46	52	60	56	50	47	
Dec.	9	28	28	30	32	51	44	37	33	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	10	-13	-14	-16	-12	-06	-07	-08	-08	
Feb.	7	3	1	-04	5	15	16	0	9	
Mar.	15	3	-01	0	10	19	21	19	17	
Apr.	4	23	22	26	37	43	46	39	36	
May	11	35	33	38	45	49	50	46	41	
June	12	42	39	50	62	72	73	65	56	
July	12	49	47	57	67	74	75	68	59	
Aug.	25	46	41	49	59	66	69	59	53	
Sept.	17	37	31	37	50	60	63	50	45	
Oct.	18	25	22	24	36	46	47	39	32	
Nov.	26	2	2	2	8	14	13	12	12	
Dec.	24	3	0	-02	2	8	-05	3	1	

TABLE NO. 5 - B

LOCATION HELENA, MONTANA YEAR 1974

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	17	30	30	39	42	55	61	55	44	38	31	26	39
04	17	29	28	37	40	52	57	52	41	35	30	25	36.9
07	16	29	28	40	45	60	65	56	45	37	28	25	39.5
10	19	34	35	49	53	70	75	65	56	48	37	30	47.6
13	23	39	41	55	57	77	82	70	65	58	43	35	53.8
16	21	39	42	55	57	77	83	71	67	57	40	32	53.4
19	19	34	34	48	50	69	74	63	54	46	36	28	46.3
22	19	32	30	44	45	61	67	58	49	42	32	27	42.2
Ave 01 - 22	18.1	32.8	33.9	46	48.6	64.9	70.4	61.5	53.5	45.8	34.7	27.7	44.8
Ave 19 - 04	18.0	31.3	30.5	42.0	44.3	59.3	64.8	57	47	40.3	32.3	26.5	41.1
Ave 07 - 16	19.8	35.3	36.5	49.8	53	71	76.2	65.5	58.3	50.0	37	30.5	48.6
Ave 19 - 07	17.6	30.8	30	41.6	44.4	59.4	64.8	56.8	46.6	39.6	31.4	26.2	40.8
Ave 10 - 16	21	37.3	39.3	53	55.7	74.7	80	68.7	62.7	54.3	40	32.3	51.6

TABLE NO. 5 - B

LOCATION HELENA, MONTANA YEAR 1975

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	20	11	26	28	42	49	61	53	44	38	26	23	35.1
04	19	10	25	26	39	47	57	50	41	35	25	24	33.1
07	19	10	25	29	44	54	64	56	46	37	26	24	36.1
10	22	15	30	35	52	61	73	65	57	45	33	28	43
13	26	20	34	39	57	66	79	71	67	52	39	32	48.1
16	25	19	33	39	57	66	79	72	68	50	35	29	47.1
19	22	15	28	34	50	59	71	63	55	44	28	27	41.1
22	20	14	26	32	45	53	65	57	48	40	26	24	37.1
Ave 01 - 22	21.1	13.7	28.8	32.9	48.6	56.9	69.2	60.9	54.1	43.3	29.9	26.0	40.1
Ave 19 - 04	20.3	12.5	26.3	30.0	44.0	52.0	63.5	55.8	47.0	39.3	26.3	24.5	36.1
Ave 07 - 16	23	16	30.5	35.5	52.5	61.8	73.8	66	59.5	46	33.3	28.3	43.0
Ave 19 - 07	20	12	26	29.8	44	52.4	63.6	55.8	46.8	38.8	26.2	24.4	36.7
Ave 10 - 16	24.3	18	32.3	37.7	55.3	64.3	77	69.3	64	49	35.7	29.7	46.4

TABLE NO. 5 - B

LOCATION HELENA, MONTANA YEAR 1976

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	22	26	25	36	46	49	57	56	49	38	30	26	38.3
04	21	24	23	33	43	47	53	53	47	35	29	25	36.1
07	21	23	24	37	49	53	63	59	50	37	28	24	39
10	27	31	32	46	59	60	74	69	61	48	36	29	47.7
13	31	37	38	52	64	65	81	75	69	56	44	35	53.9
16	30	36	39	53	66	66	81	74	71	55	39	33	53.5
19	25	30	31	45	57	58	72	66	59	45	34	30	46.0
22	23	27	27	39	50	53	63	59	53	41	31	28	40.3
Ave 01 - 22	24.9	29.5	30.4	43.2	54.1	56.6	67.6	64.8	57.9	44.9	33.8	28.7	44.7
Ave 19 - 04	22.8	26.8	26.5	38.3	49	52.8	61.3	58.5	52	39.8	31	27.3	40.2
Ave 07 - 16	27.3	31.8	33.3	47	59.3	61	74.8	69.3	62.8	49	36.8	30.3	48.6
Ave 19 - 07	22.4	26	36	53	64	64	81.6	74.8	69.3	51.6	39.2	30.4	40.1
Ave 10 - 16	29.3	34.7	36.3	50.3	62.7	63.7	78.7	72.7	67	53	39.7	32.3	51.7

TABLE NO. 5 - B

LOCATION HELENA, MONTANA YEAR 1977

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	16	30	29	38	44	57	58	56	50	40	28	20	38.8
04	16	28	28	34	42	53	55	52	46	37	28	21	36.6
07	16	27	28	40	47	60	62	59	50	38	27	20	39.5
10	20	35	35	52	56	69	71	68	60	48	35	23	47.7
13	24	42	40	61	60	74	78	74	66	56	38	26	53.3
16	24	44	40	62	60	74	77	74	67	55	35	23	52.9
19	20	35	34	50	54	68	71	65	58	46	31	21	46.1
22	19	32	31	44	48	61	62	60	54	41	29	19	41.7
Ave 01 - 22	18.0	34.1	32.4	46.9	50.4	63.6	66.3	63.6	56.3	45.6	31.2	20.7	44.1
Ave 19 - 04	17.8	31.3	30.5	41.5	47	59.8	61.5	58.3	52	41	29	20.3	40.8
Ave 07 - 16	21	37	35.8	53.8	55.8	69.3	72	68.8	60.8	49.3	33.8	23	48.4
Ave 19 - 07	17.4	30.4	24.4	41.2	47	59.8	61.6	58.4	51.6	40.4	28.6	20.2	40.1
Ave 10 - 16	22.7	40.3	38.3	58.3	58.7	72.3	75.3	72	64.3	53	36	24	51.3

TABLE NO. 5 - B				LOCATION <u>HELENA, MONTANA</u>								YEAR <u>1978</u>			
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	16	21	33	42	47	53	57	57	50	39	20	15	37.5		
04	16	19	32	39	45	50	54	53	47	37	20	13	35.4		
07	15	18	32	43	50	59	62	60	51	39	21	13	38.6		
10	17	23	39	50	57	69	71	70	59	51	24	17	45.6		
13	22	28	46	55	60	74	78	77	68	58	29	20	51.3		
16	20	29	47	55	59	74	77	77	68	58	27	19	50.8		
19	18	25	40	48	53	66	69	68	58	46	23	17	44.3		
22	18	23	37	44	49	59	61	62	54	42	22	15	40.5		
Ave 01 - 22	16.9	22.8	38.8	47.7	53.2	63.2	67.2	65.5	57.9	46.5	22.7	15.2	43.1		
Ave 19 - 04	17	22	35.5	43.3	48.5	57	60.3	60	52.3	41	21.3	15	39.4		
Ave 07 - 16	18.5	24.5	41	50.8	56.5	69	72	71	61.5	51.5	25.3	17.3	46.6		
Ave 19 - 07	16.6	21.2	34.8	43.2	48.8	57.4	60.6	60	52	40.6	21.2	14.6	39.3		
Ave 10 - 16	19.7	26.7	44	53.3	58.7	72.3	75.3	74.7	65	55.7	26.7	18.7	49.2		

TABLE NO. 5 - B				LOCATION _____										YEAR _____	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01															
04															
07															
10															
13															
16															
19															
22															
Ave 01 - 22															
Ave 19 - 04															
Ave 07 - 16															
Ave 19 - 07															
Ave 10 - 16															

TABLE NO. 5 - C - 1									LOCATION <u>HELENA, MONTANA</u>					
									FIVE YEARS <u>1974-1978</u>					
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 04	1974	18	31.3	30.5	42.0	44.3	59.3	64.8	57	47	40.3	32.3	26.5	41.1
	1975	20.3	12.5	26.3	30.0	44	52	63.5	55.8	47	39.3	26.3	24.5	36.8
	1976	22.8	26.8	26.5	38.3	49	52.8	61.3	58.5	52	39.8	31	27.3	40.2
	1977	17.8	31.3	30.5	41.5	47	59.8	61.5	58.3	52	41	29	20.3	40.8
	1978	17	22	35.5	43.3	48.5	57	60.3	60	52.3	41	21.3	15	39.4
5-Yr. Ave		19.2	24.8	30	39	46.6	56.2	62.3	60	50.1	40.3	28	22.7	39.7
Day 07 - 16	1974	19.8	35.3	36.5	49.8	53	71	76.2	65.5	58.3	50.0	37	30.5	48.6
	1975	23	16	30.5	35.5	52.5	61.8	73.8	66	59.5	46	33.3	28.3	43.9
	1976	27.3	31.8	33.3	47	59.3	61	74.8	69.3	62.8	49	36.8	30.3	48.6
	1977	21	37	35.8	53.8	55.8	69.3	72	68.8	60.8	49.3	33.8	23	48.4
	1978	18.5	24.5	41	50.8	56.5	69	72	71	61.5	51.5	25.3	17.3	46.6
5-Yr. Ave		21.9	28.9	35.4	47.4	55.4	66.4	73.8	68.1	60.6	49.2	33.2	25.9	47.2
Day/Night Dif.		4.9	4.1	5.4	8.4	8.8	10.2	11.5	8.1	10.5	8.9	5.2	3.2	7.5

TABLE NO. 5 - C - 2								LOCATION <u>HELENA, MONTANA</u>						
								FIVE YEARS <u>1974-1978</u>						
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 07	1974	17.6	30.8	30	41.6	44.4	59.4	64.8	56.8	46.6	39.6	31.4	26.2	40.8
	1975	20	12	26	29.8	44	52.4	63.6	55.8	46.8	38.8	26.2	24.4	36.7
	1976	22.4	26	26	38	49	52	61.6	58.6	51.6	39.2	30.4	26.6	40.1
	1977	17.4	30.4	24.4	41.2	47	59.8	61.6	58.4	51.6	40.4	28.6	20.2	40.1
	1978	16.6	21.2	34.8	43.2	48.8	57.4	60.6	60	52	40.6	21.2	14.6	39.3
5-Yr. Ave		18.8	24.1	28.2	38.8	46.6	56.2	62.4	57.9	49.7	39.7	27.6	22.4	39.4
Day 10 - 16	1974	21	37.3	39.3	53	55.7	74.7	80	68.7	62.7	54.3	40	32.3	51.6
	1975	24.3	18	32.3	37.7	55.3	64.3	77	69.3	64	49	35.7	29.7	46.4
	1976	29.3	34.7	36.3	50.3	62.7	63.7	78.7	72.7	67	53	39.7	32.3	51.7
	1977	22.7	40.3	38.3	58.3	58.7	72.3	75.3	72	64.3	53	36	24	51.3
	1978	19.7	26.7	44	53.3	58.7	72.3	75.3	74.7	65	55.7	26.7	18.7	49.2
5-Yr. Ave		23.4	31.4	38	50.5	58.2	68.4	77.3	71.5	64.6	53	35.6	27.4	50
Day/Night Dif.		4.6	7.3	9.8	11.7	11.6	12.2	14.9	13.6	14.9	13.3	8	5	10.6

TABLE NO. 5 - C - 3

LOCATION HELENA, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	18.1	32.8	33.9	46	48.6	64.9	70.4	61.5	53.5	45.8	34.7	27.7	44.8	1.032
1975	21.1	13.7	28.8	32.9	48.6	56.9	69.2	60.9	54.1	43.3	29.9	26.0	40.5	.933
1976	24.9	29.5	30.4	43.2	54.1	56.6	67.6	64.8	57.9	44.9	33.8	28.7	44.7	1.030
1977	18.0	34.1	32.4	46.9	50.4	63.6	66.3	63.6	56.3	45.6	31.2	20.7	44.1	1.016
1978	16.9	22.8	38.8	47.7	53.2	63.2	67.2	65.2	57.9	46.5	22.7	15.2	43.1	.993
5-Yr. Ave.	19.8	26.6	32.9	43.3	51	61	68.1	63.2	55.9	45.2	30.5	23.7	43.4	1.000

MONTHLY WET BULB TEMPERATURE

LOCATION HELENA, MONTANA MONTH July, 1976 INTERIOR DESIGN CONDITIONS 78 °db 65 °wb

wb T	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb T
	1	2	3	4	5	6	7	8 ✓	9 ✓	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
60																																	60
61																																	61
62																																	62
63																																	63
64																																	64
65							3																							3	6	65	
66																																	66
67										3																					3	67	
68																																	68
69																																	69
70																																	70
71																																	71
72																																	72
73																																	73
74																																	74
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88																																	88
89																																	89
90																																	90
91																																	91
92																																	92
93																																	93
Total Hours of Occurrence and Weight Average Wet Bulb Temperature for Month																																9	65.67

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summerized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH												
LOCATION HELENA, MONTANA										YEAR 1974-1978		
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May												
Ju	3	68.0							3	65.0	1.2	66.5
Jul	3	65.0	60	67.1	9	65.7			3	65.0	15.0	66.8
Aug									3	65.0	0.6	65.0
Sep									3	65.0	0.6	65.0
Oct												
Nov												
Dec												
Total	6	66.5	60	67.1	9	65.7			12	65.0	17.4	66.6
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

The average percent of sunshine for the six month air conditioning season in Toledo, Ohio is 55.5% based upon the five-year average of mid April to mid October.

TABLE NO. 6						Location
PERCENT OF SUNSHINE - MONTHLY AVERAGE						HELENA, MONTANA
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	25	33	42	36	35	34.2
Feb.	49	43	46	62	43	48.6
Mar.	56	54	58	41	62	54.2
Apr.	51	41	53	70	53	53.6
May	47	49	68	37	42	48.6
Jun.	71	56	49	61	70	61.4
Jul.	78	74	74	60	69	71.0
Aug.	66	70	63	59	72	66.0
Sept.	76	88	74	59	59	71.2
Oct.	75	46	63	57	73	62.8
Nov.	50	52	46	36	28	42.4
Dec.	27	36	41	38	41	36.6
Yearly	55.9	53.5	56.4	51.3	53.9	54.2

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

HELENA, MONTANA		46° N.L. P= 1.05		Single Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	232	6	23.2	46	19,850
Feb	260	7	30.6	54	27,518
Mar	266	7	36.2	60	34,633
Apr	251	7	49	57	30,045
May	232	7	58.5	60	30,206
Jun	223	7	65.4	62	29,035
Jul	227	7	75.8	79	38,915
Aug	242	7	74.1	74	38,860
Sep	254	7	62.8	67	35,738
Oct	247	7	52	61	32,695
Nov	245	5	37.2	45	16,538
Dec	227	5	28.3	43	15,130

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

HELENA, MONTANA		46° N.L. P= 1.05		Double Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	220	6	23.2	46	18,823
Feb	247	7	30.6	54	26,142
Mar	252	7	36.2	60	32,810
Apr	238	7	49	57	28,489
May	220	7	58.5	60	28,644
Jun	212	7	65.4	62	27,602
Jul	215	7	75.8	79	36,857
Aug	230	7	74.1	74	36,933
Sep	241	7	62.8	67	33,909
Oct	234	7	52	61	30,975
Nov	232	5	37.2	45	15,660
Dec	215	5	28.3	43	14,330

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

HELENA, MONTANA		46° N.L. P= 1.05		Concentrating Collector		
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	250	5	23.2	46	575	17,825
Feb	284	7	30.6	54	1074	30,059
Mar	289	11	36.2	60	1907	59,129
Apr	268	11	49	57	1680	50,411
May	256	11	58.5	60	1690	52,378
Jun	247	11	65.4	62	1685	50,536
Jul	248	11	75.8	79	2155	66,809
Aug	259	10	74.1	74	1917	59,415
Sep	269	9	62.8	67	1622	48,662
Oct	267	7	52	61	1140	35,343
Nov	244	5	37.2	45	549	16,470
Dec	224	5	28.3	43	482	14,930
					AV MO	41,830

KALISPELL WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded Kalispell recording station.

TABLE NO. 1

LOCATION		KALISPELL, MONTANA										YEAR		1975		MONTH		December		TEMPERATURE RECORD																	
D	A	Hours Per Day of Given Temperature - 5° Increment																																			
		Y-17½	-12½	7½	-2½	2½	7½	12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½												
1									9	3	3	3	6																								
2														18	6																						
3													3	21																							
4											3		6	3	12																						
5									3	6	5	9																									
6									9	3	12																										
7											9	12	3																								
8												6	12	3	3																						
9														6	12	6																					
10												9	3	9	3																						
11										3	21																										
12							6		12	6																											
13							6	9	3	3	3																										
14								3	9	3	9																										
15				3		3		3		6	9																										
16			3	3	6	3	6	3																													
17						6	3	9	6																												
18										15	9																										
19										9	15																										
20										6	18																										
21										18	6																										
22										24																											
23										6	18																										
24											9	15																									
25											6	15	3																								
26												9	12	3																							
27												3	3	18																							
28										6	9	9																									
29												24																									
30											6	9	9																								
31							3		3	3	15																										
Tot			3	6	6	9	18	30	45	144	180	123	75	63	36	6																					

KALISPELL, MONTANA

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E T U R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	13.8	2.76		8760	555,018.0
-19			5.52	1.4	8757.24	546,294.8
-18			8.28	5.5	8754.48	537,541.8
-17			11.04	12.4	8751.72	528,788.7
-16			13.8	22.1	8748.96	520,035.6
-15	-15 thru -11 -12½	11.4	16.08	34.5	8746.2	511,282.5
-14			18.36	54.0	8743.92	502,542.0
-13			20.64	73.5	8741.64	493,801.5
-12			22.92	93.0	8739.36	485,061.0
-11			25.2	112.5	8737.08	476,320.5
-10	-10 thru -6 -7½	27	30.6	132.0	8734.8	467,580.0
-9			36	170.7	8729.4	458,858.7
-8			41.4	209.4	8724	450,137.4
-7			46.8	248.1	8718.6	441,416.1
-6			52.2	286.8	8713.2	432,694.8
-5	- 5 thru -1 -2½	29.4	58.08	325.5	8707.8	423,973.5
-4			63.96	392.4	8701.92	415,280.4
-3			69.84	459.3	8696.04	406,587.3
-2			75.72	526.2	8690.16	397,894.2
-1			81.6	593.1	8684.28	389,201.1
0	0 thru 4 2½	82.8	98.16	660.0	8678.4	380,508.0
1			114.72	783.0	8661.84	371,871.0
2			131.28	906.0	8645.28	363,234.0
3			147.84	1,029.0	8628.72	354,597.0
4			164.4	1,152.0	8612.16	345,960.0
5	5 thru 9 7½	123.6	189.12	1,275.0	8595.6	337,323.0
6			213.84	1,501.2	8570.88	328,789.2
7			238.56	1,727.4	8546.16	320,255.4
8			263.28	1,953.6	8521.44	311,721.6
9			288	2,179.8	8496.72	303,187.8
10	10 thru 14 12½	220.2	332.04	2,406.0	8472	294,654.0
11			376.08	2,804.1	8427.96	286,292.1
12			420.12	3,202.2	8383.92	277,930.2
13			464.16	3,600.3	8339.88	269,568.3
14			508.2	3,998.4	8295.84	261,206.4
15	15 thru 19 17½	306	569.4	4,396.5	8251.8	252,844.5
16			630.6	5,057.7	8190.6	244,745.7
17			691.8	5,718.9	8129.4	236,646.9
18			753	6,380.1	8068.2	228,548.1
19			814.2	7,041.3	8007	220,449.3
20	20 thru 24 22½	516	917.4	7,702.5	7945.8	212,350.5
21			1020.6	8,774.7	7842.6	204,662.7
22			1123.8	9,846.9	7739.4	196,974.9
23			1227	10,919.1	7636.2	189,287.1
24			1330.2	11,991.3	7533	181,599.3
25	25 thru 29 27½	736.2	1477.44	13,063.5	7429.8	173,911.5
26			1624.68	14,761.8	7282.56	166,849.8
27			1771.92	16,460.1	7135.32	159,788.1
28			1919.16	18,158.4	6988.08	152,726.4
29			2066.4	19,866.7	6840.84	145,664.7
30	30 thru 34 32½	999.6	2266.32	21,555	6693.6	138,603.0
31			2466.24	24,121.2	6493.68	132,409.2
32			2666.18	26,687.4	6293.76	126,215.4
33			2866.08	29,253.6	6093.84	120,021.6
34			3066	31,819.8	5893.92	113,827.8
35	35 thru 39 37½	971.4	3260.28	34,386.0	5694	107,634.0
36			3454.56	37,937.7	5499.72	102,425.7
37			3648.84	41,489.4	5305.44	97,217.4
38			3843.12	45,041.1	5111.16	92,009.1
39			4037.4	48,592.8	4916.88	86,800.8

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

TEMPERATURE DEGREE	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	780	4193.4	52,144.5	4722.6	81,592.5
41			4349.4	56,571.9	4566.6	77,259.9
42			4505.4	60,999.3	4410.6	72,927.3
43			4661.4	65,426.7	4254.6	68,594.7
44			4817.4	69,854.1	4098.6	64,262.1
45	45 thru 49 47½	760.2	4969.44	74,281.5	3942.6	59,929.5
46			5121.48	79,479.0	3790.56	56,367.0
47			5273.52	84,676.5	3638.52	52,804.5
48			5425.56	89,874.0	3486.48	49,242.0
49			5577.6	95,071.5	3334.44	45,679.5
50	50 thru 54 52½	769.8	5731.56	100,269.0	3182.4	42,117.0
51			5885.52	106,231.5	3028.44	39,319.5
52			6039.48	112,194.0	2874.48	36,522.0
53			6193.44	118,156.5	2720.52	33,724.5
54			6347.4	124,119.0	2566.56	30,927.0
55	55 thru 59 57½	700.2	6487.44	130,081.5	2412.6	28,129.5
56			6627.48	136,779.0	2272.56	26,067.0
57			6767.52	143,476.5	2132.52	24,004.5
58			6907.56	150,174.0	1992.48	21,942.0
59			7047.6	156,871.5	1852.44	19,879.5
60	60 thru 64 62½	573.6	7162.32	163,569.0	1712.4	17,817.0
61			7277.04	170,903.4	1597.68	16,391.4
62			7391.76	178,237.8	1482.96	14,965.8
63			7506.48	185,572.2	1368.24	13,540.2
64			7621.2	192,906.6	1253.52	12,114.6
65	65 thru 69 67½	387	7698.6	200,241.0	1138.8	10,689.0
66			7776	208,055.7	1061.4	9,743.7
67			7853.4	215,870.4	984	8,798.4
68			7930.8	223,685.1	906.6	7,853.1
69			8008.2	231,499.8	829.2	6,907.8
70	70 thru 74 72½	291	8066.4	239,314.6	751.8	5,962.5
71			8124.6	247,468.3	693.6	5,356.2
72			8182.8	255,622.0	635.4	4,749.9
73			8241	263,775.7	577.2	4,143.6
74			8299.2	271,929.4	519	3,537.3
75	75 thru 79 77½	226.8	8344.56	280,083.1	460.8	2,931.0
76			8389.92	288,496.7	415.44	2,583.6
77			8435.28	296,908.3	370.08	2,236.2
78			8480.64	305,320.9	324.72	1,888.8
79			8526	313,733.5	279.36	1,541.4
80	80 thru 84 82½	142.2	8554.44	322,146.1	234	1,194.0
81			8582.88	330,743.2	205.56	1,031.1
82			8611.32	339,340.3	177.12	868.2
83			8639.76	347,937.4	148.68	705.3
84			8668.2	356,534.5	120.24	542.4
85	85 thru 89 87½	62.4	8680.60	365,131.6	91.8	379.5
86			8693.16	373,833.0	79.32	318.9
87			8705.64	382,534.4	66.84	258.3
88			8718.12	391,235.8	54.36	197.7
89			8730.6	399,937.2	41.88	137.1
90	90 thru 94 92½	28.3	8736.36	408,638.6	29.4	76.5
91			8742.12	417,383.6	23.64	61.5
92			8747.88	426,128.6	17.88	46.5
93			8753.64	434,873.6	12.12	31.5
94			8759.4	443,618.6	6.36	16.5
95	95 thru 99 97½	.6	8759.52	452,363.6	.6	1.5
96			8759.64	461,123.3	.48	1.0
97			8759.76	469,883.0	.36	.5
98			8759.88	478,642.7	.24	.2
99			8760	487,402.4	.12	.1

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: KALISPELL, MONTANAYEAR: 1974

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	16	43	43	43	44	47	45	44	44	
Feb.	14	34	34	35	38	41	43	34	31	
Mar.	27	29	31	33	49	60	57	42	45	
Apr.	24	55	55	59	68	72	74	65	61	
May	5	37	34	39	61	69	71	62	52	
June	15	65	62	69	81	90	91	82	74	
July	29	60	56	69	81	91	90	81	74	
Aug.	5	56	51	67	82	91	91	78	64	
Sept.	25	37	36	41	61	77	80	67	58	
Oct.	17	28	28	27	56	71	70	47	37	
Nov.	21	49	50	50	51	54	49	51	44	
Dec.	21	39	41	45	47	37	32	30	29	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	5	-10	-16	-19	-12	-01	-04	-14	-09	
Feb.	7	15	20	17	22	27	30	28	29	
Mar.	7	06	03	03	21	30	30	25	23	
Apr.	17	29	28	32	48	55	57	46	39	
May	3	32	28	38	54	59	62	54	49	
June	1	39	33	49	61	68	68	65	50	
July	13	44	38	56	67	77	80	74	56	
Aug.	9	42	38	50	58	71	71	65	54	
Sept.	27	32	27	30	39	51	52	49	47	
Oct.	23	20	19	20	44	55	53	32	27	
Nov.	3	21	18	17	34	43	42	24	22	
Dec.	31	14	12	08	18	25	25	25	24	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: KALISPELL, MONTANA

YEAR: 1975

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	20	34	38	40	40	38	34	31	25	
Feb.	12	36	36	36	39	40	41	38	38	
Mar.	1	33	33	33	37	40	45	36	30	
Apr.	12	27	24	34	46	56	60	50	33	
May	14	38	38	51	65	75	78	65	56	
June	12	42	39	57	73	80	79	71	58	
July	27	57	55	71	83	94	98	87	66	
Aug.	5	58	58	64	77	87	90	80	67	
Sept.	15	44	42	50	67	78	80	60	51	
Oct.	2	35	32	40	61	71	72	51	40	
Nov.	3	47	49	51	61	60	58	57	54	
Dec.	9	45	48	42	51	54	48	44	46	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	00	-01	-05	-02	04	-01	-17	-06	
Feb.	8	07	02	-05	-05	07	07	-12	-17	
Mar.	12	01	14	04	23	31	33	27	26	
Apr.	1	15	13	14	24	28	31	28	23	
May	25	37	27	43	47	50	51	49	44	
June	29	35	32	46	57	65	66	63	44	
July	18	51	44	58	70	77	77	70	61	
Aug.	9	43	36	55	69	77	80	72	56	
Sept.	19	35	32	34	51	59	61	50	37	
Oct.	16	29	28	31	41	52	54	50	50	
Nov.	30	-08	-05	04	11	13	14	14	17	
Dec.	16	-05	-03	-12	-01	13	07	02	05	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: KALISPELL, MONTANA

YEAR: 1976

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	16	39	39	39	40	46	41	36	31	
Feb.	8	12	10	09	23	46	45	40	36	
Mar.	31	29	29	35	48	58	60	51	41	
Apr.	11	38	42	47	62	70	72	63	53	
May	27	41	42	57	70	81	79	65	52	
June	29	49	47	67	80	89	90	78	75	
July	26	58	53	63	76	86	88	78	66	
Aug.	6	59	58	62	70	82	85	65	58	
Sept.	1	57	54	58	70	83	85	69	63	
Oct.	1	42	36	42	66	78	76	55	53	
Nov.	1	52	48	47	50	55	52	43	29	
Dec.	16	37	30	28	31	45	39	26	23	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	1	-02	-05	-02	03	12	13	11	13	
Feb.	5	01	-03	00	06	12	14	12	14	
Mar.	2	01	-02	-02	04	10	13	02	-01	
Apr.	3	28	25	30	43	52	54	44	35	
May	15	32	30	44	53	62	64	58	39	
June	5	37	37	50	60	64	69	62	53	
July	2	40	35	52	65	74	77	72	54	
Aug.	17	38	39	46	64	67	69	60	47	
Sept.	9	33	30	42	56	66	69	49	39	
Oct.	18	19	16	17	39	46	45	27	22	
Nov.	27	01	06	09	15	18	17	18	17	
Dec.	20	13	11	09	20	26	26	24	23	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: KALISPELL, MONTANA

YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	18	30	26	28	35	42	37	35	27	
Feb.	16	29	30	27	34	45	52	44	38	
Mar.	6	26	28	30	46	53	55	44	43	
Apr.	24	55	51	56	70	81	83	66	56	
May	31	55	49	56	68	77	77	70	54	
June	6	55	52	65	77	88	91	83	74	
July	23	55	52	69	84	91	92	82	61	
Aug.	18	64	60	67	79	90	92	72	77	
Sept.	5	61	58	60	67	75	75	64	50	
Oct.	16	29	30	32	55	66	62	45	35	
Nov.	12	33	31	40	46	53	46	32	28	
Dec.	3	40	38	40	41	43	40	37	35	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	2	-03	-04	-05	06	11	12	11	12	
Feb.	3	12	13	11	17	27	30	19	15	
Mar.	20	11	13	18	24	32	35	31	32	
Apr.	2	24	22	26	29	35	39	33	28	
May	6	26	32	41	51	54	54	50	49	
June	12	41	39	52	62	71	73	66	58	
July	11	44	39	56	64	73	74	66	57	
Aug.	27	50	51	52	56	53	64	51	43	
Sept.	27	31	29	33	49	56	56	49	48	
Oct.	27	21	19	19	42	49	46	36	36	
Nov.	21	-13	-11	-01	05	11	08	-03	-04	
Dec.	31	10	04	-04	-06	06	01	-14	-20	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: KALISPELL, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	6	39	38	37	40	40	34	32	32	
Feb.	3	22	25	27	31	39	42	38	39	
Mar.	29	33	30	37	52	63	67	55	44	
Apr.	25	42	44	48	60	67	66	61	58	
May	20	39	39	54	64	71	71	65	58	
June	28	51	52	61	75	85	88	74	65	
July	24	51	48	63	81	91	88	75	55	
Aug.	5	54	52	68	81	93	93	80	59	
Sept.	4	55	54	59	75	83	83	67	58	
Oct.	9	35	32	34	56	67	66	49	50	
Nov.	7	39	38	43	55	59	56	55	57	
Dec.	11	25	32	36	38	38	37	34	34	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	2	01	02	00	00	05	-02	-08	-04	
Feb.	14	-03	-05	00	11	18	20	19	17	
Mar.	3	09	05	01	10	17	17	17	18	
Apr.	13	24	21	34	47	50	53	44	44	
May	8	32	28	44	56	63	66	61	54	
June	1	39	38	48	59	64	68	65	47	
July	11	42	39	52	64	61	61	59	51	
Aug.	26	40	38	47	62	68	69	54	45	
Sept.	17	29	28	32	48	55	53	38	31	
Oct.	31	21	18	19	34	42	40	26	20	
Nov.	22	01	01	08	12	17	18	19	20	
Dec.	31	-16	-14	-28	-23	-13	-15	-24	-30	

TABLE NO. 5A

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: KALISPELL, MONTANAYEAR: AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.		37	36.8	37.4	39.8	42.6	38.2	35.6	31.8	
Feb.		26.6	27	26.8	33	42.2	44.6	38.8	36.4	
Mar.		30	30.2	33.6	46.4	54.8	56.8	45.6	40.6	
Apr.		43.4	43.2	48.8	61.2	69.2	71	61	52.2	
May		42	40.4	51.4	65.6	74.6	75.2	65.4	54.4	
June		52.4	50.4	63.8	77.2	86.4	87.8	77.6	69.2	
July		56.2	52.8	67	81	90.6	91.2	80.6	64.4	
Aug.		58.2	55.8	65.6	77.8	88.6	90.2	75	65	
Sept.		50.8	48.8	53.6	68	79.2	80.6	65.4	56	
Oct.		33.8	31.6	35	58.8	70.6	69.2	49.4	43	
Nov.		44	43.8	46.7	52.6	56.2	52.2	47.6	42.4	
Dec.		33.6	37.8	38.2	41.6	43.4	39.2	34.2	33.4	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.		-2.8	-4.8	-6.2	-01	6.2	3.6	-3.4	1.2	
Feb.		6.4	5.4	4.6	10.2	18.2	20.2	13.2	11.6	
Mar.		5.4	6.6	4.8	16.2	24	25.6	20.4	19.6	
Apr.		24	21.8	27.2	38.2	44	46.8	39	33.8	
May		31.8	29	42	52.2	57.6	59.4	54.4	47	
June		37.8	35.8	49	59.8	66.4	68.8	64.2	50.4	
July		44.2	39	54.8	66	72.4	73.8	68.2	55.8	
Aug.		42.6	40.4	50	61.8	67.2	70.6	60.4	49	
Sept.		32	29.2	34.2	48.6	57.4	58.2	47	40.4	
Oct.		22	20	21.2	40	48.8	47.6	34.2	31	
Nov.		.4	1.8	7.4	15.4	20.4	19.8	14.4	14.4	
Dec.		3.2	2	-5.4	1.6	11.4	8.8	2.6	0.4	

TABLE NO. 5 - B

KALISPELL,
LOCATION MONTANA YEAR 1974

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	20	29	30	39	41	52	55	53	43	31	32	28	37.8
04	19	28	28	37	39	51	52	51	41	29	31	27	36.1
07	19	28	29	40	46	60	63	58	47	30	31	27	39.8
10	21	32	36	47	52	69	73	69	59	49	36	31	47.8
13	24	36	40	51	55	75	79	74	67	59	40	34	52.8
16	23	36	39	52	56	76	79	74	68	57	37	32	52.4
19	21	32	34	46	51	70	72	65	54	40	33	29	45.6
22	21	30	30	42	45	58	60	58	46	33	32	29	40.3
Ave 01 - 22	20.2	31.7	33.7	44.8	48.3	63.4	65.9	63.2	53.8	42.8	34.3	29	44.3
Ave 19 - 04	20.5	29.8	30.5	41	44	57.8	59.8	56.8	46	33.3	32	28.3	40
Ave 07 - 16	21.6	33	36	47.5	52.3	70	73.5	68.8	60.3	48.8	36	31	48.2
Ave 19 - 07	20	29.4	30.2	40.8	44.4	58.2	60.4	57	46.2	32.6	31.8	28	39.9
Ave 10 - 16	22.7	34.7	38.3	50	54.3	73.3	77	72.3	64.7	55	37.7	32.3	51

TABLE NO. 5 - B

KALISPELL,
LOCATION MONTANA YEAR 1975

AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS

hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	19	18	26	33	42	48	59	53	42	39	27	27	36.1
04	18	18	25	31	40	45	55	51	41	38	26	26	34.5
07	17	17	24	34	47	54	66	57	47	39	26	26	37.8
10	20	21	31	42	55	61	77	66	60	46	33	28	45
13	26	26	35	46	59	66	84	71	68	50	37	31	49.9
16	25	26	35	47	59	64	84	71	69	49	34	29	49.3
19	20	22	30	41	53	59	75	64	54	43	30	28	43.3
22	20	20	27	36	46	52	64	57	46	40	28	27	38.6
Ave 01 - 22	18.2	19.2	28	38.9	50	56.2	69.9	61.5	54.5	43.6	30.1	27.3	41.5
Ave 19 - 04	19.3	19.5	27	35.3	45.3	51	63.3	56.3	45.8	40	27.8	27	38.1
Ave 07 - 16	22	22.5	31.3	42.3	55	61.3	77.8	66.3	61	46	32.5	28.5	45.5
Ave 19 - 07	18.8	19	26.4	35	45.6	51.6	63.8	56.4	46	39.8	27.4	26.8	38.1
Ave 10 - 16	23.7	24.3	33.7	45	57.7	63.7	81.7	69.3	65.7	48.3	34.7	29.3	48.1

TABLE NO. 5 - B														KALISPELL, LOCATION MONTANA YEAR 1976									
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS																							
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave										
01	23	27	27	38	44	40	55	55	47	33	29	25	36.9										
04	22	26	25	36	42	46	52	53	44	32	28	24	35.8										
07	21	25	26	40	50	54	61	57	49	33	28	23	38.9										
10	25	30	32	48	58	61	70	67	62	46	33	29	46.8										
13	31	34	38	53	64	64	76	72	71	54	38	33	52.3										
16	30	34	38	63	64	65	77	72	72	53	36	31	52.9										
19	25	29	32	46	58	60	71	63	57	41	31	27	45										
22	24	28	30	40	49	52	61	57	50	36	29	26	40.2										
Ave 01 - 22	24.1	29	31.6	44.8	53.4	56.3	64.6	62.8	56.8	41.4	31.3	27.2	43.6										
Ave 19 - 04	23.5	27.5	28.5	40	48.3	49.5	59.8	57	49.5	35.5	29.3	25.5	39.5										
Ave 07 - 16	26.8	30.8	33.5	51	59	61	71	67	63.5	46.5	33.8	29	47.7										
Ave 19 - 07	23	27	28	40	48.6	50.4	60	57	49.4	35	29	25	39.4										
Ave 10 - 16	28.7	32.7	36	54.7	62	63.3	74.3	70.3	68.3	51	35.7	31	50.7										

TABLE NO. 5 - B														KALISPELL, LOCATION MONTANA YEAR 1977									
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS																							
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave										
01	17	27	31	36	44	51	55	55	45	34	27	20	36.8										
04	16	27	30	34	42	48	51	53	43	32	26	19	35.1										
07	16	26	31	40	48	60	61	60	47	33	26	19	38.9										
10	20	31	37	52	56	70	69	68	57	47	31	21	46.6										
13	24	36	41	59	60	74	74	74	63	54	35	23	51.4										
16	23	37	41	61	59	75	75	74	62	53	33	22	51.3										
19	21	30	35	60	53	69	69	65	53	42	28	20	45.4										
22	19	29	32	41	47	57	59	58	48	37	27	20	39.5										
Ave 01 - 22	19.4	30.9	34.7	46.4	50.4	61.5	63.5	63.6	52.2	42.0	28.8	19.4	42.7										
Ave 19 - 04	18.3	28.3	32	42.8	46.5	56.3	58.5	57.8	47.3	36.3	27	19.8	39.2										
Ave 07 - 16	20.8	32.5	37.5	53	55.8	69.8	69.8	69	57.3	46.8	31.3	21.3	47.1										
Ave 19 - 07	17.8	27.8	31.8	42.4	46.8	57	59	58.2	47.2	35.6	26.8	19.6	39.2										
Ave 10 - 16	22.3	34.7	39.7	57.3	58.3	73	72.7	72	60.6	51.3	33	22	49.7										

TABLE NO. 5 - B <div> LOCATION <u>KALISPELL, MONTANA</u> YEAR <u>1978</u> </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	20	23	29	38	43	49	54	51	46	34	24	14	35.4
04	19	22	28	37	41	47	51	49	45	32	23	13	33.9
07	19	22	28	40	47	56	61	57	48	33	22	13	37.2
10	21	26	37	48	53	66	70	67	58	49	28	17	45
13	24	31	42	52	55	70	76	72	64	56	32	21	49.6
16	24	31	43	52	55	70	75	72	63	55	30	19	49.1
19	22	27	37	45	51	64	68	63	54	41	26	16	42.8
22	21	25	33	41	45	54	59	55	49	35	25	14	38
Ave 01 - 22	19.7	25.5	34.6	44.0	48.8	59.5	64.5	61.6	54.0	42.7	25.9	14.2	41.3
Ave 19 - 04	20.5	24.3	31.8	40.3	45	53.5	58	54.5	48.5	35.5	24.5	14.3	37.6
Ave 07 - 16	22	27.5	37.5	48	52.5	65.5	70.5	67	58.3	48.3	28	17.5	45.2
Ave 19 - 07	20.2	23.8	31	40.2	45.4	54	58.6	55	48.4	35	24	14	37.5
Ave 10 - 16	23	29.3	40.7	50.7	54.3	68.7	73.7	70.3	61.7	53.3	30	19	47.9

TABLE NO. 5 - B <div> LOCATION _____ YEAR _____ </div>													
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01													
04													
07													
10													
13													
16													
19													
22													
Ave 01 - 22													
Ave 19 - 04													
Ave 07 - 16													
Ave 19 - 07													
Ave 10 - 16													

TABLE NO. 5 - C - 1										LOCATION		KALISPELL, MONTANA				FIVE YEARS		1974-1978	
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH																			
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave					
Night 19 - 04	1974	20.5	29.8	30.5	41	44	57.8	59.8	56.8	46	33.3	32	28.3	40					
	1975	19.3	19.5	27	35.3	45.3	51	63.3	56.3	45.8	40	27.8	27	38.1					
	1976	23.5	27.5	28.5	40	48.3	49.5	59.8	57	49.5	35.5	29.3	25.5	39.5					
	1977	18.3	28.3	32	42.8	46.5	56.5	58.5	57.8	47.3	36.3	27	19.8	39.2					
	1978	20.5	24.3	31.8	40.3	45	53.5	58	54.5	48.5	35.5	24.5	14.3	37.6					
5-Yr. Ave		20.4	25.9	30	39.9	45.8	53.6	59.9	56.5	47.4	36.1	28.1	23	38.9					
Day 07 - 16	1974	21.6	33	36	47.5	52.3	70	73.5	68.8	60.3	48.8	36	31	48.2					
	1975	22	22.5	31.3	42.3	55	61.3	77.8	66.3	61	46	32.5	28.5	45.5					
	1976	26.8	30.8	33.5	51	59	61	71	67	63.5	46.5	33.8	29	47.7					
	1977	20.8	32.5	37.5	53	55.8	69.8	69.8	69	57.3	46.8	31.3	21.3	47.1					
	1978	22	27.5	37.5	48	52.5	65.5	70.5	67	58.3	48.3	28	17.5	45.2					
5-Yr. Ave		22.6	29.3	35.2	48.4	54.9	65.5	72.5	67.6	60.1	47.3	32.3	25.5	46.7					
Day/Night Dif.		2.2	3.4	5.2	8.5	9.1	11.9	12.6	11.1	12.7	11.2	4.2	2.5	7.8					

TABLE NO. 5 - C - 2														KALISPELL, LOCATION <u>MONTANA</u> FIVE YEARS <u>1974-1978</u>	
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH															
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave	
Night 19 - 07	1974	20	29.4	30.2	40.8	44.4	58.2	60.4	57	46.2	32.6	31.8	28	39.9	
	1975	18.8	19	26.4	35	45.6	51.6	63.8	56.4	46	39.8	27.4	26.8	38.1	
	1976	23	27	28	40	48.6	50.4	60	57	49.4	35	29	25	39.4	
	1977	17.8	27.8	31.8	42.4	46.8	57	59	58.2	47.2	35.6	26.8	19.6	39.2	
	1978	20.2	23.8	31	40.2	45.4	54	58.6	55	48.4	35	24	14	37.5	
5-Yr. Ave		20	25.4	29.5	39.7	46.2	54.2	60.4	56.7	47.4	35.6	27.8	22.7	38.8	
Day 10 - 16	1974	22.7	34.7	38.3	50	54.3	73.3	77	72.3	64.7	55	37.7	32.3	51	
	1975	23.7	24.3	33.7	45	57.7	63.7	81.7	69.3	65.7	48.3	34.7	29.3	48.1	
	1976	28.7	32.7	36	54.7	62	63.3	74.3	70.3	68.3	51	35.7	31	50.7	
	1977	22.3	34.7	39.7	57.3	58.3	73	72.7	72	60.6	51.3	33	22	49.7	
	1978	23	29.3	40.7	50.7	54.3	68.7	73.7	70.3	61.7	53.3	30	19	47.9	
5-Yr. Ave		24.1	31.1	37.7	51.5	57.3	68.4	75.9	70.8	64.2	51.8	34.2	26.7	49.5	
Day/Night Dif.		4.1	5.7	8.2	11.8	11.1	14.2	15.5	14.1	16.8	16.2	6.4	4	10.7	

TABLE NO. 5 - C - 3

LOCATION KALISPELL, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	20.2	31.7	33.7	44.8	48.3	63.4	65.9	63.2	53.8	42.8	34.3	29	44.3	1.04
1975	18.2	19.2	28	38.9	50	56.2	69.9	61.5	54.5	43.6	30.1	27.3	41.5	.97
1976	24.1	29	31.6	44.8	53.4	56.3	64.6	62.8	56.8	41.4	31.3	27.2	43.6	1.02
1977	19.4	30.9	34.7	46.4	50.4	61.5	63.5	63.6	52.2	42	28.8	19.4	42.7	1.00
1978	19.7	25.5	34.6	44	48.8	59.5	64.5	61.6	54	42.7	25.9	14.2	41.3	.97
5-Yr. Ave.	20.3	27.3	32.5	45.4	50.2	59.4	65.7	62.5	54.3	42.5	30.1	23.4	42.7	1.00

MONTHLY WET BULB TEMPERATURE

LOCATION KALISPELL, MONTANA

MONTH July, 1974

INTERIOR DESIGN CONDITIONS 78 °db

65 °wb

wb T	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb T	
	1	2	3	4	5	6	7	8 [✓]	9 [✓]	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
60																																	60	
61																																	61	
62																																	62	
63																																	63	
64																																	64	
65														3			6													3		12	65	
66																		6														6	66	
67																			6													6	67	
68														3																		3	68	
69																																	69	
70																																	70	
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90																																	90	
91																																	91	
92																																	92	
93																																	93	
Total Hours of Occurrence and Weight Average Wet Bulb Temperature for Month																																	27	66

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summerized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2				WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH								
LOCATION KALISPELL, MONTANA								YEAR 1974-1978				
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May												
Ju	33	66.6			6	65.5	6	66			9	66.4
Jul	27	66	135	67.3	15	65	6	65.5	6	65.5	37.8	66.8
Aug	9	66	3	66	12	65					4.8	65.5
Sep									6	65	1.2	65
Oct												
Nov												
Dec												
Total	69	66.3	138	67.3	33	65.1	12	65.8	12	65.3	44	66.6
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

The average percent of sunshine for the six month air conditioning season in Toledo, Ohio is 55.5% based upon the five-year average of mid April to mid October.

TABLE NO. 6						Location
PERCENT OF SUNSHINE - MONTHLY AVERAGE						KALISPELL, MONTANA
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	8.8	8.7	8.6	8.5	9.1	8.74
Feb.	8.7	7.9	8.1	8.6	9.1	8.48
Mar.	8.1	7.9	7.9	8.9	7.8	8.12
Apr.	8.5	7.8	7.4	5.6	8.4	7.54
May	8.1	7.1	6.1	8.3	8.4	7.6
Jun.	4.7	7.6	7.5	5.9	5.5	6.24
Jul.	4.9	3.6	5.4	6.6	4.5	5
Aug.	6.1	6.3	6.5	5.1	6.2	6.04
Sept.	4.5	2.7	3.7	7.0	7.4	5.06
Oct.	5.3	8.5	6.3	6.5	5.5	6.42
Nov.	9.0	7.8	8.2	8.4	8.2	8.32
Dec.	9.1	8.7	8.5	9.0	8.8	8.82
Yearly	7.15	7.05	7.02	7.37	7.41	7.2

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

KALISPELL, MONTANA		48° N.L. $P = \frac{1.1}{1.0} - \text{Summer}$ $\quad \quad \quad \text{Winter}$		Double Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	221	6	23.1	19	7,810
Feb	248	7	29.6	25	12,152
Mar	254	7	35.6	29	15,984
Apr	263	7	47.8	33	18,226
May	243	7	57.3	45	23,729
Jun	234	7	63.5	53	26,044
Jul	238	7	72.6	81	41,833
Aug	253	7	70.8	71	38,980
Sep	266	7	60.7	60	33,516
Oct	236	7	48.5	42	21,509
Nov	234	5	34.7	23	8,073
Dec	217	5	27.3	16	5,382

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

<div> <div>KALISPELL, MONTANA</div> <div> 48° N.L. P= $\frac{1.1}{1.0}$ - Summer - Winter </div> <div>Double Glazed Collector</div> </div>					
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	210	6	23.1	19	7,421
Feb	235	7	29.6	25	11,515
Mar	241	7	35.6	29	15,166
Apr	249	7	47.8	33	17,256
May	230	7	57.3	45	22,460
Jun	222	7	63.5	53	24,709
Jul	226	7	72.6	81	39,724
Aug	240	7	70.8	71	36,977
Sep	252	7	60.7	60	31,752
Oct	224	7	48.5	42	20,415
Nov	222	5	34.7	23	7,659
Dec	206	5	27.3	16	5,109

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

KALISPELL, MONTANA		48° N.L. P= $\frac{1.1}{1.0}$ - Summer - Winter		Concentrating Collector		
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	238	5	23.1	19	226	7,009
Feb	270	7	29.6	25	473	13,230
Mar	275	9	35.6	29	718	22,250
Apr	280	11	47.8	33	1016	30,492
May	268	11	57.3	45	1327	41,125
Jun	259	11	63.5	53	1510	45,299
Jul	259	11	72.6	81	2308	71,538
Aug	271	10	70.8	71	1924	59,647
Sep	282	9	60.7	60	1523	45,684
Oct	254	7	48.5	42	747	23,150
Nov	233	5	34.7	23	268	8,039
Dec	214	5	27.3	16	171	5,307
					AV MO	31,064

MILES CITY WEATHER DATA

Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded Miles recording station.

TABLE NO. 1

LOCATION		MILES CITY, MONTANA										YEAR		1976 MONTH		February		TEMPERATURE RECORD													
D A	Hours Per Day of Given Temperature - 5° Increment																														
	Y	-7½	-2½	2½	7½	12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½	02½	07½						
1										3	15	6																			
2										9	9	6																			
3				6	3	3	6	3		3																					
4			12	12																											
5			12	12																											
6		9			3	3	3	6																							
7							6	6	3	6	3																				
8								6	3	3		12																			
9									3	12	9																				
10									15	9																					
11									9	3	9	3																			
12								3	6	3	12																				
13								6	3	9	3	3																			
14								6	3	6	6	3																			
15								3	9	6	3	3																			
16								6	3	6	6	3																			
17									6	12	6																				
18									3	12	6	3																			
19								9	6	6	3																				
20						6	3	3	6	6																					
21							9		6	3		6																			
22								6	3		6	3	3	3																	
23										3	15		6																		
24								6	3	3	6		3	3																	
25									9	3	3	3		6																	
26									6	9	3	6																			
27									6	15	3																				
28					3	3	3	3	12																						
29				3	6	3	6	6																							
30																															
31																															
Tot		9	24	30	9	15	30	72	135	162	114	48	12	12																	

MILES CITY, MONTANA

DEGREE HOUR TABLE NO. 1B
5-Year Average 1974 - 1978

T E M P. E R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	37.8	7.56		8760.00	581,278.0
-19			15.12	3.8	8752.44	572,536.9
-18			22.68	15.1	8744.88	563,795.8
-17			30.24	34.0	8737.32	555,054.7
-16			37.8	60.5	8729.76	546,313.6
-15	-15 thru -11 -12½	64.8	50.76	94.5	8722.20	537,572.5
-14			63.72	164.7	8709.24	528,882.7
-13			76.68	234.9	8696.28	520,192.9
-12			89.64	305.1	8683.32	511,503.1
-11			102.60	375.3	8670.36	502,813.3
-10	-10 thru -6 -7½	87	120	445.5	8657.40	494,123.5
-9			137.4	591.6	8640.00	485,509.6
-8			154.8	737.7	8622.60	476,895.7
-7			172.2	883.8	8605.20	468,281.8
-6			189.6	1,029.9	8587.80	459,667.9
-5	- 5 thru -1 -2½	135	216.6	1,176.0	8570.4	451,054.0
-4			243.6	1,433.1	8543.40	442,551.1
-3			270.6	1,690.2	8516.40	434,048.2
-2			297.6	1,947.3	8489.40	425,545.3
-1			324.6	2,204.4	8462.40	417,042.4
0	0 thru 4 2½	160.2	356.64	2,461.5	8435.40	408,539.5
1			388.68	2,866.2	8403.36	400,184.2
2			420.72	3,270.9	8371.32	391,828.9
3			452.76	3,675.6	8339.28	383,473.6
4			484.80	4,080.3	8307.24	375,118.3
5	5 thru 9 7½	224.4	529.68	4,485.0	8275.20	366,763.0
6			574.56	5,082.0	8230.32	358,600.0
7			619.44	5,679.0	8185.44	350,437.0
8			664.32	6,276.0	8140.56	342,274.0
9			709.20	6,873.0	8095.68	334,111.0
10	10 thru 14 12½	274.8	764.16	7,420.0	8050.80	325,948.0
11			819.12	8,316.6	7995.84	318,034.6
12			874.08	9,163.2	7940.88	310,121.2
13			929.04	10,010.2	7885.92	302,707.8
14			984.00	10,856.4	7830.96	294,794.4
15	15 thru 19 17½	286.2	1041.24	11,703.0	7776.00	286,881.0
16			1098.48	12,830.1	7718.76	279,248.1
17			1155.72	13,957.2	7661.52	271,615.2
18			1212.96	15,084.3	7604.28	263,982.3
19			1270.2	16,211.4	7547.04	256,349.4
20	20 thru 24 22½	376.2	1345.44	17,338.5	7489.80	248,716.5
21			1420.68	18,796.8	7414.56	241,414.8
22			1495.92	20,255.1	7339.32	234,113.1
23			1571.16	21,713.4	7264.08	226,811.4
24			1646.40	23,171.7	7188.84	219,509.7
25	25 thru 29 27½	523.2	1751.04	24,630.0	7113.60	212,208.0
26			1855.68	26,538.0	7008.96	205,356.0
27			1960.32	28,446.0	6904.32	198,504.0
28			2064.96	30,354.0	6799.68	191,652.0
29			2169.60	32,262.0	6695.04	184,800.0
30	30 thru 34 32½	644.4	2298.48	34,170.0	6590.40	177,948.0
31			2427.36	36,661.8	6461.52	171,679.8
32			2556.24	39,153.6	6332.64	165,411.6
33			2685.12	41,645.4	6203.76	159,143.4
34			2814.00	44,137.2	6074.88	152,875.2
35	35 thru 39 37½	661.2	2946.24	46,629.0	5946.00	146,607.0
36			3078.48	49,773.6	5813.76	140,991.6
37			3210.72	52,918.2	5081.52	135,376.2
38			3342.96	56,062.8	5549.28	129,760.8
39			3475.20	59,207.4	5417.04	124,145.4

DEGREE HOUR TABLE NO. 1B
5-Year Average 1974 - 1978

TEMPERATURE DEGREE	Temperature Range Degrees Mean Temperature Degree	Hours of Occur- rence	No. of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	638.4	3602.88	62,352.0	5284.8	118,530.0
41			3730.56	66,146.4	5157.12	113,564.4
42			3858.24	69,940.7	5029.44	108,598.8
43			3985.92	73,735.2	4901.76	103,633.2
44			4113.60	77,529.6	4774.08	98,667.6
45	45 thru 49 47½	656.4	4244.88	81,324.0	4646.40	93,702.0
46			4376.16	85,765.8	4515.12	89,383.8
47			4507.44	90,207.6	4383.84	85,065.6
48			4638.72	94,649.4	4252.56	80,747.4
49			4770.00	99,091.2	4121.28	76,429.2
50	50 thru 54 52½	660.6	4902.12	103,533.0	3990.00	72,111.0
51			5034.24	108,633.3	3857.88	68,451.3
52			5166.36	113,733.6	3725.76	64,791.6
53			5298.48	118,833.9	3593.64	61,131.9
54			5430.60	123,934.2	3461.52	57,472.2
55	55 thru 59 57½	640.8	5558.76	129,034.5	3329.4	53,812.5
56			5686.92	134,785.5	3201.24	50,803.5
57			5815.08	140,536.5	3073.08	47,794.5
58			5943.24	146,287.5	2944.92	44,785.5
59			6071.40	152,038.5	2816.76	41,776.5
60	60 thru 64 62½	603.6	6192.12	157,789.5	2688.60	35,758.5
61			6312.84	164,162.7	2567.88	33,371.7
62			6433.56	170,535.9	2447.16	30,984.9
63			6554.28	176,909.1	2326.44	28,598.1
64			6675.00	183,282.3	2205.72	26,211.3
65	65 thru 69 67½	582.6	6791.52	189,655.5	2085.00	23,824.5
66			6908.04	196,621.8	1968.48	22,030.8
67			7024.56	203,588.1	1851.96	20,237.1
68			7141.08	210,554.4	1735.44	18,443.4
69			7257.60	217,520.7	1618.92	16,649.7
70	70 thru 74 72½	492	7356.00	224,487.0	1502.40	14,856.0
71			7454.40	231,990.6	1404.00	13,599.6
72			7552.80	239,494.2	1305.60	12,343.2
73			7651.20	246,997.8	1207.20	11,086.8
74			7749.60	254,501.4	1108.80	9,830.4
75	75 thru 79 77½	370.2	7823.64	262,005.0	1010.40	8,574.0
76			7897.68	269,939.7	936.36	7,748.7
77			7971.72	277,874.4	862.32	6,923.4
78			8045.76	285,809.1	788.28	6,098.1
79			8119.80	293,743.8	714.24	5,272.8
80	80 thru 84 82½	285.6	8176.92	301,678.5	640.20	4,447.5
81			8234.04	309,941.1	583.08	3,950.1
82			8291.16	318,203.7	525.96	3,452.7
83			8348.28	326,466.3	468.84	2,955.3
84			8405.40	334,728.9	411.72	2,457.9
85	85 thru 89 87½	195.6	8444.52	342,991.5	354.60	1,960.5
86			8483.64	351,494.7	315.48	1,703.7
87			8522.76	359,997.9	276.36	1,446.9
88			8561.88	368,501.1	237.24	1,190.1
89			8601.00	377,004.3	198.12	933.3
90	90 thru 94 92½	103.2	8621.64	385,507.5	159.00	676.5
91			8642.28	394,160.1	138.36	569.1
92			8662.92	402,812.7	117.72	461.7
93			8683.56	411,465.3	97.08	354.3
94			8704.20	420,117.9	76.44	246.9
95	95 thru 99 97½	55.8	8715.36	428,770.5	55.80	139.5
96			8726.52	437,502.6	44.64	89.3
97			8737.68	446,234.7	33.48	50.2
98			8748.84	454,966.8	22.32	22.3
99			8760.00	463,698.9	11.16	5.6

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: MILES CITY, MONTANAYEAR: 1974

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	15	43	41	40	48	48	50	44	41	
Feb.	26	30	30	36	49	56	52	44	42	
Mar.	17	41	39	46	65	67	59	48	34	
Apr.	25	58	52	63	78	85	84	73	65	
May	26	54	53	64	76	80	81	66	61	
June	25	71	69	79	92	97	96	88	81	
July	15	75	72	82	94	98	96	91	84	
Aug.	6	69	67	74	89	94	95	84	74	
Sept.	9	61	58	61	76	85	86	77	71	
Oct.	2	46	44	48	68	84	88	76	62	
Nov.	7	35	33	34	47	59	55	51	50	
Dec.	9	29	29	30	45	51	39	33	33	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	-22	-24	-23	-13	-05	-03	-08	-11	
Feb.	3	10	04	03	20	30	27	26	31	
Mar.	23	02	-03	00	09	15	17	11	07	
Apr.	3	29	28	29	34	39	42	34	29	
May	13	49	38	41	37	34	35	34	35	
June	1	40	36	50	61	68	69	63	56	
July	2	61	60	65	66	63	57	56	57	
Aug.	31	46	43	52	62	62	63	58	56	
Sept.	13	32	33	38	53	64	66	55	51	
Oct.	6	27	24	29	43	50	53	45	40	
Nov.	29	08	07	06	21	25	22	17	13	
Dec.	24	10	05	01	07	15	14	10	10	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: Miles City, Montana

YEAR: 1975

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	23	31	32	33	38	49	43	40	41	
Feb.	23	29	27	27	41	47	42	35	35	
Mar.	18	30	32	40	54	57	55	47	46	
Apr.	22	49	40	48	60	65	68	55	51	
May	15	77	84	64	78	85	85	75	68	
June	25	73	70	79	86	93	85	71	62	
July	28	78	74	82	96	104	103	90	84	
Aug.	6	75	67	76	87	94	96	88	80	
Sept.	15	55	49	57	75	88	85	74	65	
Oct.	3	49	45	49	70	86	83	72	64	
Nov.	4	40	40	41	60	83	67	54	51	
Dec.	9	37	34	35	40	45	45	42	40	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	11	-13	-15	-13	-06	-03	-05	-05	-05	
Feb.	5	-14	-11	-09	-06	-01	-03	-08	-07	
Mar.	29	03	01	07	21	24	23	15	14	
Apr.	1	13	13	13	18	23	22	17	15	
May	2	40	34	37	45	53	58	51	46	
June	1	44	44	54	64	67	68	60	53	
July	11	59	53	68	75	79	79	73	63	
Aug.	25	50	49	57	67	70	68	57	52	
Sept.	20	33	31	40	50	57	58	46	38	
Oct.	27	31	27	29	32	31	30	29	27	
Nov.	30	-06	-08	-11	-05	02	05	07	07	
Dec.	17	-13	-16	-14	-10	-05	-06	-01	-06	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: MILES CITY, MONTANA

YEAR: 1976

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	22	30	28	27	36	43	41	40	37	
Feb.	25	33	31	33	45	58	55	44	36	
Mar.	31	36	32	40	59	68	68	56	51	
Apr.	12	51	47	53	66	76	79	70	66	
May	28	59	58	69	82	85	84	68	61	
June	2	66	62	73	85	92	92	69	64	
July	24	77	70	80	92	103	105	92	82	
Aug.	22	72	70	77	91	98	98	89	84	
Sept.	5	67	57	67	87	94	97	82	75	
Oct.	10	49	48	48	67	81	74	65	66	
Nov.	17	43	40	39	60	65	60	57	56	
Dec.	26	35	34	39	49	53	46	45	47	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	8	-23	-25	-21	-14	-07	-04	-01	05	
Feb.	6	-01	-02	-02	14	26	26	22	17	
Mar.	3	-12	-13	-12	01	06	11	02	00	
Apr.	3	26	27	27	35	43	46	42	40	
May	2	31	26	36	45	51	52	46	41	
June	26	48	47	53	63	66	69	61	55	
July	15	55	51	62	69	74	77	69	63	
Aug.	28	54	47	59	75	84	86	74	66	
Sept.	27	34	30	37	53	61	62	52	46	
Oct.	19	19	16	19	29	37	39	38	32	
Nov.	28	-08	-13	-07	04	12	13	11	10	
Dec.	30	-02	-08	-10	01	06	07	15	17	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH
LOCATION: MILES CITY, MONTANA YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	22	22	28	20	28	35	32	24	21	
Feb.	21	37	35	37	45	58	54	44	39	
Mar.	23	36	34	40	55	69	69	57	52	
Apr.	26	50	46	56	74	83	83	76	69	
May	13	66	63	71	83	87	85	77	71	
June	25	73	70	81	93	97	93	85	77	
July	16	70	60	79	93	101	100	97	85	
Aug.	24	64	65	71	86	98	94	85	78	
Sept.	4	58	56	61	77	86	87	73	72	
Oct.	16	45	41	45	70	79	66	53	42	
Nov.	2	40	50	53	61	55	50	40	35	
Dec.	14	33	39	38	41	40	38	37	36	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	8	-15	-16	-25	-16	-09	-12	-15	-18	
Feb.	1	03	05	03	10	22	29	25	20	
Mar.	20	21	15	18	28	35	37	31	29	
Apr.	3	23	16	21	26	34	33	36	40	
May	5	45	46	54	59	61	62	56	52	
June	13	52	52	55	62	70	75	71	67	
July	14	54	49	64	73	81	83	76	72	
Aug.	30	61	57	59	65	69	62	49	49	
Sept.	26	44	39	47	58	63	63	52	45	
Oct.	10	33	30	31	33	35	39	29	26	
Nov.	21	-12	-15	-15	-05	-01	-04	00	02	
Dec.	8	-13	-17	-20	-16	-16	-20	-26	-28	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: MILES CITY, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	24	13	12	19	25	27	28	19	-01	
Feb.	21	21	20	24	29	37	38	38	36	
Mar.	30	50	44	47	67	79	77	65	58	
Apr.	26	48	45	51	60	74	71	66	63	
May	15	60	56	67	82	91	91	79	72	
June	30	65	64	69	84	90	85	80	70	
July	24	69	66	76	93	98	98	85	80	
Aug.	12	70	64	74	88	95	96	88	87	
Sept.	4	72	68	72	86	96	98	85	83	
Oct.	10	49	46	47	70	76	72	59	55	
Nov.	2	42	38	36	56	70	59	54	48	
Dec.	14	15	24	32	36	39	35	34	27	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	30	-04	-06	-15	-01	01	-04	-14	-19	
Feb.	15	-15	-17	-12	-03	02	00	-04	-05	
Mar.	3	-14	-12	-14	00	02	02	-07	-10	
Apr.	13	30	29	35	44	47	50	45	42	
May	9	39	37	51	66	70	74	62	55	
June	1	42	43	47	51	55	57	53	48	
July	21	53	53	60	69	75	65	64	56	
Aug.	3	48	44	55	64	70	73	68	60	
Sept.	18	49	47	47	47	50	52	33	35	
Oct.	31	29	27	28	43	54	53	44	36	
Nov.	21	-16	-14	-10	-06	-03	-03	-04	-04	
Dec.	30	-23	-23	-22	-20	-16	-18	-22	-22	

TABLE NO. 5A

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: MILES CITY, MONTANAYEAR: AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.		27.8	28.2	27.8	35	40.4	38.8	33.4	27.8	.
Feb.		30	28.6	31.4	41.8	51.2	48.2	41	37.6	
Mar.		22.2	36.2	42.6	60	68	65.6	54.6	48.2	
Apr.		51.2	46	54.2	67.6	76.6	77	68	62.8	
May		59.2	56.8	67	80.2	85.6	85.2	73	66.6	
June		69.2	67	76.2	88	93.8	90.2	78.6	70.8	
July		73.8	68.4	79.8	93.6	100.8	100.4	91	83	
Aug.		70	66.6	74.4	88.2	95.8	95.8	86.8	80.6	
Sept.		62.6	57.6	63.6	80.2	89.8	90.6	78.2	73.2	
Oct.		47.6	44.8	47.4	69	81.2	76.6	65	57.8	
Nov.		40	40.2	40.6	56.8	63.4	58.2	51.2	49	
Dec.		29.8	32	34.8	42.2	54.8	41	38.2	36.6	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.		-15.4	-17.2	-19.4	-10	- 5	- 5.6	- 8.6	-11.6	
Feb.		- 3.4	- 4.2	- 3.4	7	15.8	15.8	12.2	11.2	
Mar.		0	- 2.4	- 0.2	11.8	16.4	18	10.4	8	
Apr.		24.2	22.6	25	31.4	37.2	38.6	34.8	33.2	
May		40.8	36.2	43.8	50.4	53.8	56.2	49.8	45.8	
June		45.2	45	51.8	60.2	65.2	67.6	61.6	55.8	
July		56.4	53.2	63.8	70.4	74.4	72.2	67.6	62.2	
Aug.		51.8	48	56.4	66.6	71	70.4	61.2	56.6	
Sept.		38.4	36	41.8	52.2	59	60.2	47.6	43	
Oct.		27.8	24.8	27.2	36	41.4	42.8	37	32.2	
Nov.		- 6.8	- 8.6	- 7.4	1.8	7	5.6	6.2	5.6	
Dec.		- 8.2	-11.8	-13	- 7.6	- 3.2	- 4.6	- 4.8	- 3.4	

TABLE NO. 5 - B														MILES CITY, LOCATION <u>MONTANA</u> YEAR <u>1974</u>	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	16	25	28	41	46	59	69	58	30	42	49	23	40.5		
04	15	24	27	38	43	56	65	55	29	40	46	22	38.3		
07	15	25	29	44	51	66	75	63	29	42	51	21	42.6		
10	21	34	37	53	57	75	85	72	37	56	64	29	51.7		
13	25	41	43	57	59	80	90	77	43	62	69	35	56.8		
16	22	38	42	56	59	80	89	76	39	60	69	31	55.1		
19	18	32	34	49	52	72	81	68	35	52	59	27	48.3		
22	18	26	31	45	48	65	73	62	32	46	53	25	43.7		
Ave 01 - 22	18.8	31.3	34.1	48.0	52.3	69.0	77.8	66.3	35.0	50.2	57.3	27.1	47.3		
Ave 19 - 04	16.8	26.8	30	43.3	47.3	63	72	60.8	31.5	45	51.8	24.3	42.7		
Ave 07 - 16	20.8	34.5	37.8	52.5	56.5	75.3	84.8	72	37	55	63.3	29	51.6		
Ave 19 - 07	16.4	26.4	32.8	43.4	48	63.6	72.6	61.2	31	44.4	51.6	23.6	42.7		
Ave 10 - 16	22.7	37.7	40.7	55.3	58.3	78.3	88	75	39.7	59.3	67.3	31.7	54.5		

TABLE NO. 5 - B														MILES CITY, LOCATION <u>MONTANA</u> YEAR <u>1975</u>	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	20	12	23	33	48	56	68	61	50	41	26	21	38.3		
04	19	11	22	32	46	54	65	58	47	39	24	20	36.4		
07	18	11	23	35	51	62	73	65	53	41	24	21	39.8		
10	25	19	32	42	59	69	82	74	65	50	34	25	48		
13	29	24	36	46	62	73	87	80	71	56	40	29	52.8		
16	26	23	34	46	62	72	87	80	71	54	36	26	51.4		
19	22	17	28	39	55	66	79	72	61	48	31	24	45.1		
22	21	15	25	36	51	60	72	65	55	44	28	22	41.2		
Ave 01 - 22	22.2	16.4	27.7	38.8	54.3	64	76.8	69.4	58.4	47.3	31.0	22.6	44.1		
Ave 19 - 04	20.5	13.8	24.5	35	50	59	71	64	53.3	43	27.3	21.8	40.3		
Ave 07 - 16	24.5	19.3	31.3	42.3	58.5	69	82.3	74.8	65	50.3	33.5	25.3	48		
Ave 19 - 07	20	13.2	24.2	35	50.2	59.6	71.4	64.2	53.2	42.6	26.6	21.6	40.2		
Ave 10 - 16	26.7	22	34	44.7	61	71.3	85.3	78	69	53.3	36.7	26.7	50.7		

TABLE NO. 5 - B		LOCATION <u>MILES CITY,</u> <u>MONTANA</u>											YEAR <u>1976</u>	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS														
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave	
01	17	29	26	42	50	58	67	65	54	39	25	24	41.3	
04	16	27	24	40	47	56	64	62	50	36	23	23	39	
07	16	27	27	44	57	63	73	69	56	38	23	22	42.9	
10	22	35	37	51	66	71	83	80	70	49	34	28	52.2	
13	24	40	42	57	69	75	88	85	76	54	40	32	56.8	
16	22	37	41	56	69	76	87	85	75	52	35	29	55.3	
19	20	32	33	50	61	68	78	76	65	45	29	26	48.6	
22	19	29	30	46	55	62	72	69	58	41	25	25	44.3	
Ave 01 - 22	18.6	32.4	32.5	48.6	59.1	65.6	76.4	74.1	62.9	44.2	29.4	25.5	47.4	
Ave 19 - 04	18	29.3	28.3	44.5	53.3	61.3	70.3	68	56.8	40.3	25.5	24.5	43.3	
Ave 07 - 16	21	34.8	36.8	52	65.3	71.3	82.8	79.8	69.3	48.3	33	27.8	51.8	
Ave 19 - 07	17.6	28.8	28	44.4	54	61.6	70.8	68.2	56.6	39.8	25	24	43.2	
Ave 10 - 16	22.7	37.3	40	54.7	68	74	86	83.3	73.7	51.7	36.3	29.7	54.8	

TABLE NO. 5 - B		MILES CITY, LOCATION <u>MONTANA</u> YEAR <u>1977</u>											
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	6	27	29	43	54	62	65	58	53	42	24	13	39.7
04	5	25	27	39	51	60	63	56	51	40	23	12	37.7
07	4	26	30	46	58	69	72	62	55	42	24	12	41.7
10	10	33	41	58	66	77	81	71	63	54	33	16	50.3
13	13	39	46	64	71	82	85	76	69	59	37	18	54.9
16	12	38	45	64	71	80	84	75	68	56	32	16	53.4
19	9	32	37	54	64	73	76	67	60	49	28	13	46.8
22	8	30	32	48	58	67	70	62	56	45	26	14	43
Ave 01 - 22	7.7	31.7	36.2	51.2	61.4	71.1	74.4	65.8	59.2	49.1	28.5	14.2	45.9
Ave 19 - 04	7	28.5	31.3	46	56.8	65.5	68.5	60.8	55	44	25.3	13	41.8
Ave 07 - 16	9.8	34	40.5	58	66.5	77	80.5	71	63.8	52.8	31.5	15.5	50.1
Ave 19 - 07	6.4	28	31	46	57	66.2	69.2	61	55	43.6	25	12.8	41.8
Ave 10 - 16	11.7	36.7	44	62	69.3	79.7	83.3	74	66.7	56.3	34	16.7	52.9

TABLE NO. 5 - B		MILES CITY, LOCATION <u>MONTANA</u> YEAR <u>1978</u>											
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	1	9	27	40	50	57	63	62	55	41	20	11	36.3
04	0	8	25	38	48	55	60	58	53	39	19	11	34.5
07	1	8	26	43	54	63	68	66	57	41	20	10	38.1
10	6	14	34	50	60	72	77	76	67	53	26	14	45.8
13	8	18	39	55	64	76	82	82	74	59	29	17	50.3
16	7	16	38	54	64	75	80	82	74	57	26	15	49
19	4	13	32	47	57	68	73	73	64	48	23	13	42.9
22	2	10	29	44	53	61	67	67	59	43	20	11	38.8
Ave 01 - 22	2.6	11.4	31.4	46.7	56.7	66.0	71.5	70.4	63.0	48.6	22.7	12.8	42
Ave 19 - 04	1.8	10	28.3	42.3	52	60.3	65.8	65	57.8	42.8	20.5	11.5	38.1
Ave 07 - 16	5.5	14	34.3	50.5	60.5	71.8	76.8	76.5	68	52.5	25.3	14	45.8
Ave 19 - 07	1.6	9.6	27.8	42.4	52.4	60.8	66.2	65.2	57.6	42.4	20.4	11.2	38.1
Ave 10 - 16	7	16	37	53	62.7	74.3	79.7	80	71.7	56.3	27	15.3	48.4

TABLE NO. 5 - B						LOCATION _____						YEAR _____	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01													
04													
07													
10													
13													
16													
19													
22													
Ave 01 - 22													
Ave 19 - 04													
Ave 07 - 16													
Ave 19 - 07													
Ave 10 - 16													

TABLE NO. 5 - C - 1								LOCATION MILES CITY, MONTANA						
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH								FIVE YEARS 1974-1978						
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 04	1974	16.8	26.8	30	43.3	47.3	63	72	60.8	31.5	45	51.8	24.3	42.7
	1975	20.5	13.8	24.5	35	50	59	71	64	53.3	43	27.3	21.8	40.3
	1976	18	29.3	28.3	44.5	53.3	61.3	70.3	68	56.8	40.3	25.5	24.5	43.3
	1977	7.7	31.7	26.2	51.2	61.4	71.1	74.4	65.8	59.2	49.1	28.5	14.2	45.9
	1978	1.8	10	28.3	42.3	52	60.3	65.8	65	57.8	42.8	20.5	11.5	38.1
5-Yr. Ave		13	22.3	29.5	37.3	52.8	62.9	70.7	64.7	51.7	44	30.7	19.3	42.1
Day 07 - 16	1974	20.8	34.5	37.8	52.5	56.5	75.3	84.8	72	37	55	63.3	29	51.6
	1975	24.5	19.3	31.3	42.3	58.5	69	82.3	74.8	65	50.3	33.5	25.3	48
	1976	21	34.8	36.8	52	65.3	71.3	82.8	79.8	69.3	48.3	33	27.8	51.8
	1977	9.8	34	40.5	59	66.5	77	80.5	71	63.8	52.8	31.5	15.5	50.1
	1978	5.5	14	34.3	50.5	60.5	71.8	76.3	76.5	68	52.5	25.3	14	45.8
5-Yr. Ave		16.3	27.3	36.1	51.1	61.5	72.9	81.4	74.9	60.6	51.9	37.3	22.3	49.5
Day/Night Dif.		3.3	5.0	6.6	13.8	8.7	10.0	10.7	10.2	8.9	7.9	6.6	3.0	7.4

TABLE NO. 5 - C - 2										LOCATION					MILES CITY, MONTANA			
										FIVE YEARS					1974-1978			
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH																		
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave				
Night 19 - 07	1974	16.4	26.4	32.8	43.4	48	63.6	72.6	61.2	31	44.4	51.6	23.6	42.7				
	1975	20	13.2	24.2	35	50.2	59.6	71.4	64.2	53.2	42.6	26.6	21.6	40.2				
	1976	17.6	28.8	28	44.4	54	61.6	70.8	68.2	56.6	39.8	25	24	43.2				
	1977	6.4	28	31	46	57	66.2	69.2	61	55	43.6	25	12.8	41.8				
	1978	1.6	9.6	27.8	42.4	52.4	60.8	66.2	65.2	57.6	42.4	20.4	11.2	38.1				
5-Yr. Ave		12.4	21.2	23.3	42.3	52.3	62.4	70	64	50.7	42.6	29.7	18.6	41.2				
Day 10 - 16	1974	22.7	37.7	40.7	55.3	58.3	78.3	88	75	39.7	59.3	67.3	31.7	54.5				
	1975	26.7	22	34	44.7	61	71.3	85.3	78	69	53.3	36.7	26.7	50.7				
	1976	22.7	37.3	40	54.7	68	74	86	83.3	73.7	51.7	36.3	29.7	54.8				
	1977	11.7	36.7	44	62	69.3	79.7	83.3	74	66.7	56.3	34	16.7	52.9				
	1978	7	16	37	53	62.7	74.3	79.7	80	71.7	56.3	27	15.3	48.4				
5-Yr. Ave		18.2	30	39.2	54	63.9	75.5	84.5	78.1	64.2	55.4	40.3	24	52.3				
Day/Night Dif.		5.8	8.8	15.9	11.7	11.6	13.1	14.5	14.1	13.5	12.8	10.6	5.4	11.1				

TABLE NO. 5 - C - 3

LOCATION MILES CITY, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	18.8	31.3	34.1	48.0	52.3	69.0	77.8	66.3	35.0	50.2	57.3	27.1	47.3	0.957
1975	22.2	16.4	27.7	38.8	54.3	64.0	76.8	69.4	58.4	47.3	31.0	22.6	44.1	1.027
1976	18.6	32.4	32.5	48.6	59.1	65.6	76.4	74.1	62.9	44.2	29.4	25.5	47.4	0.956
1977	7.7	31.7	36.2	51.2	61.4	71.1	74.4	65.8	59.2	49.1	28.5	14.2	45.9	0.987
1978	2.6	11.4	31.4	46.7	56.7	66.0	71.5	70.4	63.0	48.6	22.7	12.8	42.0	1.079
5-Yr. Ave.	14.0	24.6	32.4	46.7	56.8	67.1	75.4	69.2	55.7	47.9	33.8	20.4	45.3	1.000

MONTHLY WET BULB TEMPERATURE

LOCATION MILES CITY, MONTANA MONTH June 1974 INTERIOR DESIGN CONDITIONS 78 °db 65 °wb

wb	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb	
T	1	2	3	4	5	6	7	8 [✓]	9 [✓]	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	T		
60																																	60	
61																																	61	
62																																	62	
63																																	63	
64																																	64	
65																											3	3					6	65
66																							6	3	3					3		15	66	
67																				3							3	3		3		12	67	
68																	3			3			3	3							12	68		
69																	3	6	3				3		3	3						21	69	
70																			3	9			6	3	6							27	70	
71																	3		3				3									9	71	
72																			3						6							9	72	
73																									3							3	73	
74																																	74	
75																																	75	
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89																																	89	
90																																	90	
91																																	91	
92																																	92	
93																																	93	
Total Hours of Occurrence and Weight Average Wet Bulb Temperature for Month																																114	68.8	

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summarized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH												
LOCATION		MILES CITY, MONTANA						YEAR 1974-1978				
Yr.	1974		1975		1976		1977		1978		Five Yr Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr	3	65									.6	65
May							3	65	18	65.8	4.2	65.7
Ju	114	68.8	39	67.2	48	66.4	15	66.2	69	67.4	57	67.7
Jul	255	66.7	216	82.9	201	66.6	84	66.1	90	66.3	169.2	70.7
Aug	36	65.7	45	66.4	66	66	6	66	15	65.4	33.6	66
Sep							12	66	24	66.5	8.4	66.1
Oct												
Nov												
Dec												
Total	414	67.2	300	78.4	315	66.4	120	66.1	216	66.6		
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

Due to incompleteness of data from the National Oceanic and Atmospheric Administration Environment Data Service it was not possible to generate data for Table No. 6, Percent of Sunshine. For estimation of Percent of Sunshine refer to tables 7 and 8.

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

<div> <div>MILES CITY, MONTANA</div> <div> 46° N.L. $P=1.05$ </div> <div>Single Glazed Collector</div> </div>					
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	232	6	20.8	45	19,418
Feb	260	7	27.2	46	23,442
Mar	266	7	35.9	42	24,243
Apr	251	7	51.6	43	22,665
May	232	7	62.6	52	26,179
Jun	223	7	71.2	6	28,098
Jul	227	7	81.7	87	42,855
Aug	242	7	79.9	84	44,112
Sep	254	7	66.7	67	35,738
Oct	247	7	55.5	65	34,839
Nov	245	5	37.8	47	17,273
Dec	227	5	27.1	48	16,889

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

<div> <div>MILES CITY, MONTANA</div> <div> 46° N.L. $P=1.05$ </div> <div>Double Glazed Collector</div> </div>					
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	220	6	20.8	45	18,414
Feb	247	7	27.2	46	22,270
Mar	252	7	35.9	42	22,967
Apr	238	7	51.6	43	21,491
May	220	7	62.6	52	24,825
Jun	212	7	71.2	6	26,712
Jul	215	7	81.7	87	40,590
Aug	230	7	79.9	84	41,924
Sep	241	7	66.7	67	33,909
Oct	234	7	55.5	65	33,006
Nov	232	5	37.8	47	16,356
Dec	215	5	27.1	48	15,996

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

MILES CITY, MONTANA		46° N.L. P= 1.05		Concentrating Collector		
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo
Jan	250	5	20.8	45	563	17,438
Feb	284	7	27.2	46	914	25,605
Mar	289	11	35.9	42	1335	41,391
Apr	268	11	51.6	43	1268	38,029
May	256	11	62.6	52	1464	45,394
Jun	247	11	71.2	6	1630	48,906
Jul	248	11	81.7	87	2373	73,574
Aug	259	10	79.9	84	2176	67,444
Sep	269	9	66.7	67	1622	48,662
Oct	267	7	55.5	65	1213	37,660
Nov	244	5	37.8	47	573	15,792
Dec	224	5	27.1	48	538	16,666
					AV MO	39,713

MISSOULA WEATHER DATA

**Extrapolated from data published by
National Oceanic and Atmospheric Administrative
Environment Data Service on local climatological
data recorded Missoula recording station.**

TABLE NO. 1

LOCATION						MISSOULA, MONTANA										YEAR 1974					MONTH					June					TEMPERATURE RECORD									
D	A	Hours Per Day of Given Temperature - 5° Increment																																						
		Y	-7½	-2½	2½	7½	12½	17½	22½	27½	32½	37½	42½	47½	52½	57½	62½	67½	72½	77½	82½	87½	92½	97½	02½	07½														
1											6		3	3		6		6																						
2												3	3	3	3		6		6																					
3													6		3	9	6																							
4													9	6	9																									
5												6	6	6	6																									
6												6	3	9	6																									
7												9	6	9																										
8													12		3	6	3																							
9											6		3	3		3	3	6																						
10											3		3	6			3	3	6																					
11												3	3		6			3	3	6																				
12													3	3		6		3	3	3	3																			
13														6		6		3	3		6																			
14															3	3	3	3		3	3		6																	
15																	3	6	6			3	3	3																
16															3		6	3		3	3	3	3																	
17															3	3		3	3	3	3		6																	
18																3	3	6			6	3	3																	
19																3	3	3		6	3		6																	
20																9		3	9	3																				
21																9	3	3	6	3																				
22																3	3	3		9		3	3																	
23																	3	3	6	3	3		6																	
24																3	3	3		3	3		6	3																
25																	6		3	3	3	3	3	3																
26																	6	6	3	3	6																			
27																6	6		3	3	3	3																		
28																3	3	3	6	3	3	3																		
29																3		3	3	3	3	6																		
30																	3	3	3		6		3	3	3															
31																																								
Tot												15	27	63	81	102	81	75	84	66	48	39	36	3																

MISSOULA, MONTANA

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E T U R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
-20	- 16 and below - 20	9.6	1.92		8760	564,294.0
-19			3.84	1.0	8758.08	555,538.8
-18			5.76	3.8	8756.16	546,783.6
-17			7.68	8.6	8754.24	538,028.4
-16			9.6	15.4	8752.32	529,273.2
-15	-15 thru -11 -12½	18	13.2	24.0	8750.4	520,518.0
-14			16.8	42.6	8746.8	511,776.6
-13			20.4	61.2	8743.2	503,035.2
-12			24	79.8	8739.6	494,293.8
-11			27.6	98.4	8736	485,552.4
-10	-10 thru -6 -7½	20.4	31.68	117.0	8732.4	476,811.0
-9			35.76	154.8	8728.32	468,088.8
-8			39.84	192.6	8724.24	459,366.6
-7			43.92	230.4	8720.16	450,644.4
-6			48	268.2	8716.08	441,922.2
-5	- 5 thru -1 -2½	30.6	54.12	306.0	8712	433,200.0
-4			60.24	369.3	8705.88	424,503.3
-3			66.36	432.6	8699.76	415,806.6
-2			72.48	495.9	8693.64	407,109.9
-1			78.6	559.2	8687.52	398,413.2
0	0 thru 4 2½	51.6	88.92	622.5	8681.4	389,716.5
1			99.84	726.9	8671.08	381,060.9
2			109.56	831.3	8660.76	372,405.3
3			119.88	935.7	8650.44	363,749.7
4			130.2	1,040.1	8640.12	355,094.1
5	5 thru 9 7½	104.4	151.08	1,144.5	8629.8	346,438.5
6			171.96	1,326.9	8608.92	337,860.9
7			192.84	1,509.3	8588.04	329,283.3
8			213.72	1,691.7	8567.16	320,705.7
9			234.6	1,874.1	8546.28	312,128.1
10	10 thru 14 12½	175.2	269.64	2,056.5	8525.4	303,550.5
11			304.68	2,378.7	8490.36	295,112.7
12			339.72	2,700.9	8455.32	286,674.9
13			374.76	3,023.1	8420.28	278,237.1
14			409.8	3,345.3	8385.24	269,799.3
15	15 thru 19 17½	310.8	471.96	3,667.5	8350.2	261,361.5
16			534.12	4,232.7	8288.04	253,166.7
17			596.28	4,797.9	8225.88	244,971.9
18			658.44	5,363.1	8163.72	236,777.1
19			720.6	5,928.3	8101.56	228,582.3
20	20 thru 24 22½	449.4	810.48	6,493.5	8039.4	220,387.5
21			900.36	7,438.8	7949.52	212,572.8
22			990.24	8,384.1	7859.64	204,758.1
23			1,080.12	9,329.4	7769.76	196,943.4
24			1,170	10,274.7	7679.88	189,128.7
25	25 thru 29 27½	702.6	1,310.52	11,220.0	7590.	181,314.0
26			1,451.04	12,741.3	7449.48	174,075.3
27			1,591.56	14,262.6	7308.96	166,836.6
28			1,732.08	15,783.9	7168.44	159,597.9
29			1,872.6	17,305.2	7027.92	152,359.2
30	30 thru 34 32½	1080	2,088.6	18,826.5	6887.4	145,120.5
31			2,304.6	21,239.1	6671.4	138,773.1
32			2,520.6	23,651.7	6455.4	132,425.7
33			2,736.6	26,064.3	6239.4	126,078.3
34			2,952.6	28,476.9	6023.4	119,730.9
35	35 thru 39 37½	939	3,140.4	30,889.5	5807.4	113,383.5
36			3,328.2	34,311.6	5619.6	108,045.6
37			3,516	37,733.7	5431.8	102,707.7
38			3,703.8	41,155.8	5244	97,369.8
39			3,891.6	44,577.9	5056.2	92,031.9

DEGREE HOUR TABLE NO. 1B

5-Year Average 1974 - 1978

T E M P. E R E	Temperature Range Degrees Mean Temperature Degrees	Hours of Occur- rence	No. of Hours Below Temperature	No. of Degree Hours of Heating Below Temperature	No. of Hours Above Temperature	No. of Degree Hours of Cooling Above Temperature
40	40 thru 44 42½	868.2	4,065.24	48,000.0	4868.4	86,694.0
41			4,238.88	52,325.7	4694.76	82,259.7
42			4,412.52	56,651.4	4521.12	77,825.4
43			4,586.16	60,977.1	4347.48	73,391.1
44			4,759.8	65,302.8	4173.84	68,956.8
45	45 thru 49 47½	744.6	4,908.72	69,628.5	4000.2	64,522.5
46			5,057.64	74,760.6	3851.28	60,894.6
47			5,206.56	79,892.7	3702.36	57,266.7
48			5,355.48	85,024.8	3553.44	53,638.8
49			5,504.4	90,156.9	3404.52	50,010.9
50	50 thru 54 52½	713.4	5,647.08	95,289.0	3255.6	46,383.0
51			5,789.76	101,150.1	3112.92	43,484.1
52			5,932.44	107,011.2	2970.24	40,585.2
53			6,075.12	112,872.3	2827.56	37,686.3
54			6,217.8	118,733.4	2684.88	34,787.4
55	55 thru 59 57½	707.4	6,359.28	124,594.5	2542.2	31,888.5
56			6,500.76	131,166.0	2400.72	29,700.0
57			6,642.24	137,737.5	2259.24	27,511.5
58			6,783.72	144,309.0	2117.76	25,323.0
59			6,925.2	150,880.5	1976.28	23,134.5
60	60 thru 64 62½	553.2	7,035.84	157,452.0	1834.8	20,946.0
61			7,146.48	164,653.8	1724.16	19,387.8
62			7,257.12	171,855.6	1613.52	17,829.6
63			7,367.76	179,057.4	1502.88	16,271.4
64			7,478.4	186,259.2	1392.24	14,713.2
65	65 thru 69 67½	389.4	7,556.28	193,461.0	1281.6	13,155.0
66			7,634.16	201,134.1	1203.72	12,068.1
67			7,712.04	208,807.2	1125.84	10,981.2
68			7,789.92	216,480.3	1047.96	9,894.3
69			7,867.8	224,153.4	970.08	8,807.4
70	70 thru 74 72½	336.6	7,935.12	231,826.5	892.2	7,720.5
71			8,002.44	239,862.6	824.88	6,996.6
72			8,069.76	247,898.7	757.56	6,272.7
73			8,137.08	255,934.8	690.24	5,548.8
74			8,204.4	263,970.9	622.92	4,824.9
75	75 thru 79 77½	229.2	8,250.24	272,007.0	555.6	4,101.0
76			8,296.08	280,326.0	509.76	3,660.0
77			8,341.92	288,645.0	463.92	3,219.0
78			8,387.76	296,964.0	418.08	2,778.0
79			8,433.6	305,283.0	372.24	2,337.0
80	80 thru 84 82½	170.4	8,467.68	313,602.0	326.4	1,896.0
81			8,500.76	322,120.8	292.32	1,654.8
82			8,535.84	330,639.6	258.24	1,413.6
83			8,569.92	339,158.4	224.16	1,172.4
84			8,604	347,677.2	190.08	931.2
85	85 thru 89 87½	101.4	8,624.28	356,196.0	156	690.0
86			8,644.56	364,850.7	135.72	584.7
87			8,664.84	373,505.4	115.44	479.4
88			8,685.12	382,160.1	95.16	374.1
89			8,705.4	390,814.8	74.88	268.8
90	90 thru 94 92½	49.2	8,715.24	399,469.5	54.6	163.5
91			8,725.08	408,199.5	44.76	133.5
92			8,734.92	416,929.5	34.92	103.5
93			8,744.76	425,659.5	25.08	73.5
94			8,754.6	434,389.5	15.24	43.5
95	95 thru 99 97½	5.4	8,755.68	443,119.5	5.4	13.5
96			8,756.76	451,876.8	4.32	8.6
97			8,757.84	460,634.1	3.24	4.9
98			8,758.92	469,391.4	2.16	2.2
99			8,760	478,148.7	1.08	.5

TABLE NO. 5

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: MISSOULA, MONTANAYEAR: 1974

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	15	41	44	45	45	46	46	47	46	
Feb.	26	39	40	40	41	48	49	38	35	
Mar.	26	44	36	38	54	58	61	51	42	
Apr.	24	45	41	47	69	77	77	71	57	
May	5	42	37	46	59	73	75	59	48	
June	15	67	65	74	85	91	95	72	64	
July	19	58	56	67	79	92	95	78	68	
Aug.	5	62	56	65	77	89	93	80	70	
Sept.	25	44	38	45	62	75	85	69	49	
Oct.	1	43	39	42	57	73	71	56	49	
Nov.	21	42	47	52	54	57	53	50	48	
Dec.	21	33	40	34	45	37	30	25	24	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	6	-15	-16	-17	-13	-06	-04	-03	-02	
Feb.	11	13	10	17	21	27	32	22	17	
Mar.	20	7	5	9	20	25	32	24	25	
Apr.	17	29	27	35	47	59	64	52	42	
May	16	30	26	38	45	50	54	45	39	
June	1	38	37	47	60	70	74	64	51	
July	12	50	43	53	63	71	77	71	58	
Aug.	15	45	42	49	60	72	75	65	54	
Sept.	13	34	33	36	48	62	69	52	43	
Oct.	6	26	22	25	38	51	54	40	33	
Nov.	30	19	20	22	24	26	24	21	23	
Dec.	29	16	14	13	17	21	19	19	19	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: MISSOULA, MONTANA

YEAR: 1975

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	18	33	33	41	41	44	41	35	28	
Feb.	12	36	37	35	39	42	41	39	37	
Mar.	15	28	29	30	38	42	50	40	38	
Apr.	13	31	27	36	50	61	61	49	41	
May	14	43	37	47	60	74	82	66	57	
June	12	47	44	54	70	80	78	69	56	
July	10	72	61	73	86	95	95	86	78	
Aug.	5	62	56	65	77	91	92	79	66	
Sept.	7	52	44	51	68	79	85	66	54	
Oct.	5	43	43	42	57	72	76	57	52	
Nov.	3	53	44	43	59	61	59	49	41	
Dec.	3	48	50	50	44	56	47	49	40	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg. Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	31	-7	-14	-14	-10	1	5	3	-3	
Feb.	6	-2	-5	-5	-2	7	8	9	11	
Mar.	28	10	7	10	19	30	31	30	30	
Apr.	1	21	18	18	25	34	32	25	20	
May	1	29	27	35	45	55	54	50	39	
June	28	37	39	47	55	58	60	56	47	
July	1	52	46	54	68	79	64	65	59	
Aug.	25	42	37	44	56	65	66	57	48	
Sept.	19	34	32	36	48	62	64	53	40	
Oct.	23	28	27	28	31	37	36	28	28	
Nov.	30	-2	5	7	10	13	13	14	16	
Dec.	16	4	6	4	11	18	18	15	15	

MONTHLY EXTREME TEMPERATURE

WARMEST AND COLDEST DAY OF MONTH

LOCATION: MISSOULA, MONTANA

YEAR: 1976

Temperature Warmest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	27	30	30	35	45	45	45	41	41	
Feb.	23	30	30	28	40	54	50	43	41	
Mar.	31	32	31	34	55	66	62	53	40	
Apr.	11	38	35	42	58	71	75	60	53	
May	27	45	51	55	72	85	86	73	61	
June	29	69	67	71	81	90	89	80	79	
July	6	60	53	65	78	91	93	82	69	
Aug.	6	54	50	62	75	87	82	74	65	
Sept.	1	53	46	55	70	83	90	69	65	
Oct.	1	48	40	43	61	73	77	58	55	
Nov.	9	42	41	41	46	55	48	37	37	
Dec.	27	36	40	36	40	40	37	30	24	

Temperature Coldest Day of Month
Three Hour Increment

Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	1	10	6	3	8	11	12	11	6	
Feb.	5	8	5	3	9	17	21	15	12	
Mar.	3	5	-2	1	8	16	18	13	8	
Apr.	3	29	28	31	42	54	60	48	40	
May	15	38	31	43	56	66	68	59	47	
June	26	36	32	47	57	66	68	60	47	
July	13	47	42	53	65	71	76	69	53	
Aug.	27	37	36	44	57	67	71	62	52	
Sept.	9	38	34	39	54	68	74	55	45	
Oct.	19	21	20	21	35	47	50	35	28	
Nov.	27	1	6	0	8	14	13	12	14	
Dec.	20	8	5	7	11	21	19	13	11	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: MISSOULA, MONTANA

YEAR: 1977

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	18	32	31	32	34	42	43	38	37	
Feb.	18	39	38	32	42	55	55	39	31	
Mar.	23	30	27	29	43	57	59	44	42	
Apr.	25	57	47	53	72	83	80	72	64	
May	31	50	43	54	67	79	82	73	58	
June	6	61	55	67	81	92	90	86	70	
July	23	72	65	71	83	90	91	86	71	
Aug.	1	61	55	63	77	90	95	85	70	
Sept.	6	50	48	53	66	80	83	70	55	
Oct.	16	37	34	32	44	65	63	48	42	
Nov.	12	30	29	33	38	50	45	36	29	
Dec.	3	39	40	38	39	41	40	37	37	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	2	-4	-7	-8	0	6	8	6	5	
Feb.	5	14	8	8	16	28	32	20	16	
Mar.	20	16	18	15	21	25	27	26	24	
Apr.	2	24	18	25	31	35	35	32	29	
May	6	25	26	33	44	51	53	53	44	
June	12	43	44	52	62	72	67	64	54	
July	7	43	37	50	63	73	78	74	64	
Aug.	28	42	40	45	61	66	63	61	56	
Sept.	27	34	35	36	47	53	53	49	49	
Oct.	27	28	26	24	30	46	50	42	39	
Nov.	21	4	0	-2	5	13	14	12	13	
Dec.	31	15	14	3	9	13	9	-1	-5	

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: MISSOULA, MONTANA

YEAR: 1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.	6	38	37	36	37	39	35	35	35	
Feb.	3	36	37	32	33	40	40	34	34	
Mar.	29	40	36	38	54	72	75	60	51	
Apr.	25	47	47	48	60	71	68	63	60	
May	20	45	39	50	64	70	72	66	52	
June	28	53	47	60	73	87	87	77	63	
July	26	60	50	61	77	90	95	86	74	
Aug.	5	63	64	68	80	91	94	83	66	
Sept.	4	62	54	61	74	84	87	79	67	
Oct.	8	38	38	37	54	67	70	53	44	
Nov.	7	33	30	31	46	58	57	53	59	
Dec.	11	23	24	33	32	38	35	35	30	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.	2	-15	-20	-20	-15	-6	-7	-9	-4	
Feb.	13	13	7	0	8	17	19	13	10	
Mar.	3	10	8	7	14	20	22	21	20	
Apr.	13	28	25	30	43	53	56	45	48	
May	23	37	35	36	37	32	33	33	34	
June	1	41	34	47	58	64	67	60	50	
July	19	44	43	52	65	70	72	68	58	
Aug.	28	45	43	48	60	72	75	66	55	
Sept.	17	33	28	32	45	55	55	46	42	
Oct.	31	24	20	18	32	42	44	28	26	
Nov.	19	12	10	9	9	10	10	10	9	
Dec.	31	-13	-16	-20	-17	-12	-12	-19	-22	

TABLE NO. 5A

MONTHLY EXTREME TEMPERATURE
WARMEST AND COLDEST DAY OF MONTH

LOCATION: MISSOULA, MONTANAYEAR: AVERAGE - 1974-1978

Temperature Warmest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 78°
		01	04	07	10	13	16	19	22	
Jan.		34.8	35	37.8	40.4	43.2	42	39.2	37.4	
Feb.		36	36.4	33.4	39	47.8	47	38.6	35.6	
Mar.		34.8	31.8	33.8	48.8	61.4	60.2	49.6	42.6	
Apr.		43.6	39.4	45.2	61.8	72.6	72.2	63	55	
May		45	42.4	50.4	64.4	77.4	79.4	67.4	55.2	
June		59.4	55.6	65.2	78	88	87.8	76.8	66.4	
July		66.4	57	67.8	80.6	91.6	93.8	83.6	72	
Aug.		60.4	56.2	64.6	77.2	89.6	91.2	80.2	67.4	
Sept.		52.2	46	53	68	80.2	86	70.6	58	
Oct.		41.8	38.8	39.2	54.6	70	71.4	54.4	48.4	
Nov.		40	38.2	40	48.6	56.2	52.4	45	42.8	
Dec.		35.8	38.8	38.2	40	42.4	37.8	35.2	31	

Temperature Coldest Day of Month Three Hour Increment										
Month	Day of Month	Hour of Day								Deg.Hrs. to 70°
		01	04	07	10	13	16	19	22	
Jan.		-6.2	-10.2	-11.2	-6	1.5	2.8	1.6	.4	
Feb.		9.2	5	4.6	10.4	19.2	22.4	15.8	13.2	
Mar.		9.6	7.2	8.4	16.4	23.2	26	22.8	21.4	
Apr.		26.2	23.2	27.8	38.4	47	49.4	40.4	35.8	
May		31.8	29	37	45.4	50.8	52.4	48	40.6	
June		39	37.4	48	58.4	66	67.2	60.8	49.8	
July		47.2	42.2	52.4	64.8	72.8	73.4	69	57	
Aug.		42.2	39.6	46	58.8	68.4	70	62.2	53	
Sept.		34.6	32.4	35.6	48.4	60	63	51	43.8	
Oct.		25.4	23	23.2	33.2	44.6	46.8	34.6	30.8	
Nov.		6.8	8.2	7.2	11.2	15.2	14.8	13.8	15	
Dec.		6	4.6	1.4	6.2	12.2	10.6	5.4	3.6	

TABLE NO. 5 - B		LOCATION <u>MISSOULA,</u> <u>MONTANA</u>										YEAR <u>1974</u>	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	19	28	31	38	40	54	57	56	46	36	31	27	38.6
04	18	28	29	36	38	50	53	53	42	33	31	26	36.4
07	19	28	29	39	44	59	61	58	46	33	31	25	39.3
10	21	33	36	48	53	69	72	68	59	48	35	28	47.5
13	25	37	41	55	58	78	81	77	70	59	41	32	54.5
16	24	38	43	55	58	79	82	78	72	60	38	30	54.8
19	22	32	36	48	51	71	74	68	59	46	34	27	47.3
22	22	30	33	42	43	60	63	60	51	40	32	27	41.9
Ave 01 - 22	21.2	31.9	35.4	45.9	48.5	65	68.1	65.1	57.1	46.3	34.7	27.8	45.6
Ave 19 - 04	20.3	29.5	32.3	41	43	58.8	61.8	59.3	49.5	38.8	32	26.8	41.1
Ave 07 - 16	22.3	34	37.3	49.3	53.3	71.3	74	70.3	61.8	50	36.3	28.8	49.1
Ave 19 - 07	20	29.2	31.6	40.6	43.2	58.8	61.6	59	48.8	37.6	31.8	26.4	40.7
Ave 10 - 16	23.3	36	40	52.7	56.3	75.3	78.3	74.3	67	55.7	38	30	52.2

TABLE NO. 5 - B													MISSOULA, LOCATION MONTANA		YEAR 1975
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	23	19	29	32	41	46	61	52	44	39	26	24	36.3		
04	21	19	28	31	39	45	57	49	41	37	25	25	34.8		
07	21	19	27	33	45	52	65	55	45	38	24	24	37.3		
10	24	23	33	42	53	61	76	65	59	44	31	27	44.8		
13	27	28	38	47	57	66	84	73	70	51	37	30	50.1		
16	26	28	39	47	57	65	85	74	72	49	34	28	50.3		
19	24	24	34	40	52	59	76	65	58	41	29	26	44		
22	23	23	31	35	46	51	67	57	48	39	27	24	39.3		
Ave 01 - 22	22.7	22.4	33	39.3	49.2	55.4	71.8	62.1	56.1	43.6	30.4	25.7	42.6		
Ave 19 - 04	22.8	21.3	30.5	34.5	44.5	50.3	65.3	55.8	47.8	39	26.8	24.8	38.6		
Ave 07 - 16	24.5	24.5	34.3	42.3	53	61	77.5	66.8	61.5	45.5	31.5	27.3	45.8		
Ave 19 - 07	22.4	20.8	29.8	34.2	44.6	50.6	65.2	55.6	47.2	38.8	26.2	24.6	38.3		
Ave 10 - 16	25.7	26.3	36.7	45.3	55.7	64	81.7	70.7	67	48	34	28.3	48.6		

TABLE NO. 5 - B		LOCATION <u>MISSOULA, MONTANA</u>										YEAR <u>1976</u>	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01	26	29	30	38	45	48	56	54	48	37	29	22	38.5
04	25	27	28	36	43	46	52	50	44	33	28	21	36.1
07	25	26	28	40	49	52	61	56	48	34	27	21	38.9
10	29	31	35	48	60	60	71	66	60	46	34	25	47.1
13	33	36	41	55	67	66	79	75	71	55	40	30	54
16	32	36	41	56	68	66	81	75	73	55	37	28	54
19	29	32	35	48	60	61	73	66	60	44	31	25	47
22	28	31	32	42	52	53	62	58	52	39	30	22	41.8
Ave 01 - 22	28	31.7	34.8	46.3	55	56.8	66.8	63.2	57.4	43.9	32.3	24.4	45.1
Ave 19 - 04	27	29.8	31.3	41	50	52	60.8	57	51	38.3	29.5	22.5	40.9
Ave 07 - 16	29.8	32.3	36.3	49.8	61	61	73	68	63	47.5	34.5	26	48.5
Ave 19 - 07	26.6	29	30.6	40.8	49.8	52	60.8	56.8	50.4	37.4	29	22.2	40.5
Ave 10 - 16	31.3	34.3	39	53	65	64	77	72	68	52	37	27.7	51.7

TABLE NO. 5 - B													MISSOULA, LOCATION <u>MONTANA</u>		YEAR <u>1977</u>
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
Hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	16	27	29	37	42	55	56	59	47	37	29	25	38.3		
04	15	25	28	32	40	50	53	54	45	35	28	24	35.8		
07	14	23	29	38	46	59	60	61	47	35	27	24	38.6		
10	19	32	35	51	54	70	70	71	56	43	32	25	46.5		
13	24	39	41	61	59	76	77	80	64	54	36	28	53.3		
16	24	41	42	62	59	76	78	79	65	54	35	27	53.5		
19	19	32	35	52	53	70	72	72	57	44	31	25	46.8		
22	18	29	31	44	46	60	63	63	51	40	29	24	41.5		
Ave 01 - 22	18.6	31.9	34.2	46.9	50.3	63.4	65.8	67.6	54.6	44.2	31.3	24.5	44.4		
Ave 19 - 04	17	28.3	30.8	41.3	45.3	58.8	61	62	50	39	29.3	24.5	40.6		
Ave 07 - 16	20.3	33.8	36.8	53	54.5	70.3	71.3	72.8	58	46.5	32.5	26	48		
Ave 19 - 07	16.4	27.2	30.4	40.6	45.4	58.8	60.8	61.8	49.4	38.2	28.8	24.4	40.2		
Ave 10 - 16	22.3	37.3	39.3	58	57.3	74	75	76.7	61.7	50.3	34.3	26.7	51.1		

TABLE NO. 5 - B													MISSOULA, LOCATION MONTANA		YEAR 1978
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS															
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave		
01	23	26	33	40	43	50	54	54	48	38	24	15	37.3		
04	22	25	31	38	41	46	51	50	45	35	23	15	35.2		
07	22	24	31	39	45	55	59	56	47	34	23	14	37.4		
10	24	27	40	49	51	65	70	66	56	47	27	16	44.8		
13	28	32	48	54	55	71	78	75	64	57	32	20	51.2		
16	27	33	49	53	56	71	78	75	66	58	30	19	51.3		
19	24	29	41	46	50	65	72	68	56	47	26	18	45.2		
22	24	27	36	43	45	56	61	59	50	41	25	15	40.2		
Ave 01 - 22	24.2	27.3	39.8	46.1	48.3	59.6	65.3	63.5	55.1	45.3	26.7	15.9	43.1		
Ave 19 - 04	23.3	26.8	35.3	41.8	44.8	54.3	59.5	59.8	49.8	40.3	24.5	15.8	39.5		
Ave 07 - 16	25.3	29	42	48.8	51.8	65.5	71.3	68	58.3	49	28	17.3	46.2		
Ave 19 - 07	23	26.2	34.4	41.2	44.8	54.4	59.4	57.4	49.2	39	24.2	15.4	39.1		
Ave 10 - 16	26.3	30.7	45.7	52	54	69	75.3	72	62	54	29.7	18.3	49.1		

TABLE NO. 5 - B				LOCATION _____								YEAR _____	
AVERAGE MONTHLY TEMPERATURE BY THE MONTH - 3 HOUR INCREMENTS													
hr of day	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
01													
04													
07													
10													
13													
16													
19													
22													
Ave 01 - 22													
Ave 19 - 04													
Ave 07 - 16													
Ave 19 - 07													
Ave 10 - 16													

TABLE NO. 5 - C - 1														MISSOULA, LOCATION MONTANA FIVE YEARS 1974-1978	
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH															
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave	
Night 19 - 04	1974	20.3	29.5	32.3	41	43	58.8	61.8	59.3	49.5	38.8	32	26.8	41.1	
	1975	22.8	21.3	30.5	34.5	44.5	50.3	65.3	55.8	47.8	39	26.8	24.8	38.6	
	1976	27	29.8	31.3	41	50	52	60.8	57	51	38.3	29.5	22.5	40.9	
	1977	17	28.3	30.8	41.3	45.3	58.8	61	62	50	39	29.3	24.5	40.6	
	1978	23.3	26.8	35.3	41.8	44.8	54.3	59.5	57.8	49.8	40.3	24.5	15.8	39.5	
5-Yr. Ave		22.1	27.1	32	39.9	45.5	54.8	61.7	58.4	49.6	39.1	28.4	22.9	40.1	
Day 07 - 16	1974	22.3	34	37.3	49.3	53.3	71.3	74	70.3	61.8	50	36.3	28.8	49.1	
	1975	24.5	24.5	34.3	42.3	53	61	77.5	66.8	61.5	45.5	31.5	27.3	45.8	
	1976	24.8	32.3	36.3	49.8	61	61	73	68	63	47.5	34.5	26	48.5	
	1977	20.3	33.8	36.8	53	54.5	70.3	71.3	72.8	58	46.5	32.5	26	48	
	1978	25.3	29	42	48.8	51.8	65.5	71.3	68	58.3	49	28	17.3	46.2	
5-Yr. Ave		24.4	30.7	37.3	48.6	54.7	65.8	73.4	69.2	60.5	47.7	32.6	25.1	47.5	
Day/Night Dif.		2.3	3.6	5.3	8.7	9.2	11	11.7	10.8	10.9	8.6	4.2	2.2	7.4	

TABLE NO. 5 - C - 2										MISSOULA, LOCATION MONTANA FIVE YEARS 1974-1978				
AVERAGE YEARLY DAY/NIGHT TEMPERATURE BY THE MONTH														
Year		Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sep	Oct	Nov	Dec	Yr Ave
Night 19 - 07	1974	20	29.2	31.6	40.6	43.2	58.8	61.6	59	48.8	37.6	31.8	26.4	40.7
	1975	22.4	20.8	29.8	34.2	44.6	50.6	65.2	55.6	47.2	38.8	26.2	24.6	38.3
	1976	26.6	29	30.6	40.8	49.8	52	60.8	56.8	50.4	37.4	29	22.2	40.5
	1977	16.4	27.2	30.4	40.6	45.4	58.8	60.8	61.8	49.4	38.2	28.8	24.4	40.2
	1978	23	26.2	34.4	41.2	44.8	54.4	59.4	57.4	49.2	39	24.2	15.4	39.1
5-Yr. Ave		21.7	26.5	31.4	39.5	45.6	54.9	61.6	58.1	49	38.2	28	22.6	39.8
Day 10 - 16	1974	23.3	36	40	52.7	56.3	75.3	78.3	74.3	67	55.7	38	30	52.2
	1975	25.7	26.3	36.7	45.3	55.7	64	81.7	70.7	67	48	34	28.3	48.6
	1976	31.3	34.3	39	53	65	64	77	72	68	52	37	27.7	51.7
	1977	22.3	37.3	39.3	58	57.3	74	75	76.7	61.7	50.3	34.3	26.7	51.1
	1978	26.3	30.7	45.7	52	54	69	75.3	72	62	54	29.7	18.3	49.1
5-Yr. Ave		25.8	32.9	40.1	52.2	57.7	69.3	77.5	73.1	65.1	52	34.6	26.2	50.5
Day/Night Dif.		4.1	6.4	8.7	12.7	12.1	14.4	15.9	15	16.1	13.8	6.6	3.6	10.7

TABLE NO. 5 - C - 3

LOCATION MISSOULA, MONTANAFIVE YEARS 1974-1978

AVERAGE MONTHLY TEMPERATURE FOR FIVE YEARS BY THE MONTH - - - PROPORTION FACTORS FOR DEGREE HOURS

Year	Jan	Feb	Mar	Apr	May	Ju	Jul	Aug	Sept	Oct	Nov	Dec	Year Average	PF _{dh}
1974	21.2	31.9	35.4	45.9	48.5	65	68.1	65.1	57.1	46.3	34.7	27.8	45.58	.9688
1975	22.7	22.4	33	39.3	49.2	55.4	71.8	62.1	56.1	43.6	30.4	25.7	42.64	1.0356
1976	28	31.7	34.8	46.3	55	56.8	66.8	63.2	57.4	43.9	32.3	24.4	45.05	.9802
1977	18.6	31.9	34.2	46.9	50.3	63.4	65.8	67.6	54.6	44.2	31.3	24.5	44.44	.9937
1978	24.2	27.3	39.8	46.1	48.3	59.6	65.3	63.5	55.1	45.3	26.7	15.9	43.09	1.0248
5-Yr. Ave.	22.94	29.04	35.44	44.9	50.26	60.04	67.56	64.3	56.06	44.66	31.08	23.66	44.16	1.0

MONTHLY WET BULB TEMPERATURE

LOCATION MISSOULA, MONTANA

MONTH June, 1974

INTERIOR DESIGN CONDITIONS 78 °db

65 °wb

wb	Day of Month and Hours of Wet Bulb Temperature Occurrence Above Design Conditions																															Total hours occur for month	wb
T	1	2	3	4	5	6	7	8✓	9✓	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		T
60																																	60
61																																	61
62																																	62
63																																	63
64																																	64
65														3	3			6			6											18	65
66														3																		3	66
67															3	3		3	3				6									18	67
68																	3	3					3	6								15	68
69															3	3	3															9	69
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TABLE NO. 5 - D - 2 WET BULB TEMPERATURE

Table No. 5 - D - 2 is a summary of the wet bulb temperatures compiled from the climatological data on the monthly Tables No. 5 - D - 1. The hours of occurrence and the weighted average wet bulb by the month for five consecutive years is summerized on Table No. 5 - D - 2. At the bottom of the Table the total number of hours of occurrence for the year is listed and the weighted average wet bulb calculated. On the right side of the table the five year average hours of occurrence is listed and the weight average wet bulb calculated. At the bottom of the right column the five year weighted average wet bulb temperature is given.

TABLE NO. 5 - D - 2 WET BULB TEMPERATURE FIVE YEAR WEIGHTED AVERAGE BY THE MONTH												
LOCATION <u>MISSOULA, MONTANA</u> YEAR <u>1974-1978</u>												
Yr.	1974		1975		1976		1977		1978		Five Yr. Average	
Mon	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T	Hrs of occ.	Wt. Ave wb T
Jan												
Feb												
Mar												
Apr												
May												
Ju	63	66.9	3	66	6	65.5	6	66	3	66	16.2	66.7
Jul	15	66.8	114	66.8	18	66.5	3	65	3	65	30.6	66.7
Aug	6	65	6	66.5	18	65.2	9	65.3			7.8	65.4
Sep												
Oct												
Nov												
Dec												
Total	84	66.7	123	66.8	42	65.8	18	65.5	6	65.5	54.6	66.5
YEARLY & FIVE YEAR WEIGHTED AVERAGE WET BULB TEMPERATURE												

TABLE NO. 6 - PERCENT SUNSHINE

From the Climatological Data for each month, as published by the National Climatological Center, the daily and average daily sunshine for the month can be obtained. This data has been compiled in Table No. 6 for the 5-year period 1974 - 1978, and the 5-year monthly average calculated.

This information can be used when calculating the effect of solar gain over a span of time.

The average percent of sunshine for the six month air conditioning season in Toledo, Ohio is 55.5% based upon the five-year average of mid April to mid October.

TABLE NO. 6 PERCENT OF SUNSHINE - MONTHLY AVERAGE						MISSOULA, MONTANA
MONTH	YEAR					FIVE YEAR AVERAGE
	1974	1975	1976	1977	1978	
Jan.	30	21	34	26	22	26.6
Feb.	36	36	46	54	37	41.8
Mar.	43	50	55	39	69	51.2
Apr.	43	44	55	71	54	53.4
May	45	45	67	29	31	53.4
Jun.	76	44	50	58	63	58.2
Jul.	73	75	74	62	71	71.0
Aug.	68	63	62	67	67	65.4
Sept.	83	88	79	49	49	69.6
Oct.	78	30	65	56	71	60.0
Nov.	28	34	37	30	30	31.8
Dec.	24	24	14	23	38	24.6
Yearly	52.3	46.2	53.2	47	54.1	50.6

TABLE NO. 7 - SOLAR ENERGY AVAILABLE

MISSOULA, MONTANA		46° N.L. $P = \frac{1.1}{1.0}$ - Summer - Winter		Single Glazed Collector	
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	221	6	24.7	28	11,510
Feb	248	7	31.5	39	18,957
Mar	254	7	38.6	49	27,008
Apr	263	7	50.3	52	28,720
May	243	7	59.1	56	29,529
Jun	234	7	65.7	57	28,010
Jul	238	7	75.5	79	40,800
Aug	253	7	73.8	74	40,627
Sep	266	7	63.1	65	36,309
Oct	236	7	50.5	51	26,118
Nov	234	5	36.6	32	11,232
Dec	217	5	28.3	25	8,409

TABLE NO. 7a- SOLAR ENERGY AVAILABLE

<div> <div>MISSOULA, MONTANA</div> <div> 46° N.L. P= 1.1 - Summer 1.0 - Winter </div> <div>Double Glazed Collector</div> </div>					
Month	I_T LAT+10 BTU/FT ²	# of Coll Hrs.	Av. Daytime Ambient of	% Clear	Rx Days in Mo BTU/MO/FT ²
Jan	210	6	24.7	28	10,937
Feb	235	7	31.5	39	17,963
Mar	241	7	38.6	49	25,626
Apr	249	7	50.3	52	27,191
May	230	7	59.1	56	27,950
Jun	222	7	65.7	57	26,573
Jul	226	7	75.5	79	38,743
Aug	240	7	73.8	74	38,539
Sep	252	7	63.1	65	34,398
Oct	224	7	50.5	51	24,790
Nov	222	5	36.6	32	10,656
Dec	206	5	28.3	25	7,983

TABLE NO. 8 - SOLAR ENERGY AVAILABLE

MISSOULA, MONTANA		46°N.L. $P = \frac{1.1}{1.0} - \text{Summer}$ Winter					Concentrating Collector
Month	Idn Av. Val. Direct Norm.	# Of Coll Hrs.	Av. Daytime Amb.	% Clear	R BTU/Day	RX Days Mo	
Jan	238	5	24.7	28	333	10,329	
Feb	270	7	31.5	39	737	20,639	
Mar	275	9	38.6	49	1213	37,595	
Apr	280	11	50.3	52	1602	48,048	
May	268	11	59.1	56	1651	51,177	
Jun	259	11	65.7	57	1624	48,718	
Jul	259	11	75.5	79	2251	69,772	
Aug	271	10	73.8	74	2005	62,167	
Sep	282	9	63.1	65	1650	49,491	
Oct	254	7	50.5	51	907	28,110	
Nov	233	5	36.6	32	373	11,184	
Dec	214	5	28.3	25	268	8,293	
						AV MO	37,127

TABLE NO. 4 SERIES

Average Temperature Difference For
Estimating Annual Energy Use (Roofs)

Average Temperature Difference For
Estimating Annual Energy Use (Walls)

Direct Solar And Diffused Sky Radiation
For Glass

Shading Coefficients And "U" Values For
Glass

TABLE NO. 4A-3
ROOFSAVERAGE TEMPERATURE DIFFERENCE FOR ESTIMATING ANNUAL ENERGY USE
(CLDT)

Roof No.	ROOF DESCRIPTION *Upper No. without ceiling *Lower No. with ceiling	AVERAGE TEMPERATURE DIFFERENCE																	
		SOLAR TIME														WITHOUT CEILING		WITH CEILING	
		7	8	9	10	11	12	13	14	15	16	17	18	AV	TIME 9-17	TIME 7-18	TIME 9-17	TIME 7-18	
1	Sheet Steel with 1" or 2" insulation	6 -1	19 9	34 23	49 37	61 50	71 62	78 71	79 77	77 78	70 74	59 67	45 56	54 50	64	54	60	50	
2	1" wood with 1" insulation	-2 2	4 3	14 7	27 13	39 21	52 30	62 40	70 48	74 55	74 60	70 62	62 61	46 35	54	46	40	35	
3	4" light weight concrete	-3 0	1 0	9 4	20 10	32 19	49 29	55 39	64 48	70 56	73 62	71 65	66 64	42 33	48	42	37	33	
4	2" heavy weight concrete with 1" or 2" of insulation	-1 13	3 13	11 14	20 16	30 20	41 25	51 30	59 35	65 39	66 43	66 46	62 46	39 28	45	39	30	28	
5	1" wood with 2" insulation	-6 5	-3 5	5 7	16 12	27 18	39 25	49 33	57 41	63 48	64 53	62 57	57 57	36 30	42	36	33	30	
6	6" light weight concrete	1 10	1 8	3 7	7 8	15 11	23 16	33 22	43 29	51 36	58 42	62 48	64 52	30 24	33	30	24	24	
7	2½" wood with 1" insulation	7 18	6 16	6 15	9 15	13 16	20 18	27 21	34 25	42 30	48 34	53 38	55 41	27 24	28	27	24	24	
8	8: light weight concrete	11 20	9 18	7 15	7 14	9 14	13 15	19 17	25 20	33 25	39 29	46 34	50 38	22 22	22	22	20	22	
9	4" heavy weight concrete with 1" or 2" insulation	8 21	8 20	10 20	14 21	20 22	26 24	33 27	40 29	46 32	50 34	53 36	53 38	30 27	32	30	27	27	
10	2½" wood deck with 2" insulation	10 22	9 20	8 18	9 18	13 18	17 20	23 22	29 25	36 28	41 32	46 35	49 38	23 24	23	23	23	24	
11	Roof terrace system	16 24	14 23	13 22	13 22	15 22	18 23	22 23	26 25	31 26	36 28	40 29	44 31	24 26	24	24	24	26	
12	6" heavy weight concrete with 1" or 2" insulation	15 23	14 22	14 21	16 21	18 22	22 23	26 25	31 26	36 28	40 30	43 32	45 33	27 26	27	27	25	26	
13	4" wood with 1" or 2" insulation	22 27	20 26	18 24	17 23	16 22	17 21	18 22	21 22	24 24	28 25	32 27	36 30	22 24	21	22	23	24	

- Extrapolated from ASHRAE Handbook of Fundamentals
- Values are approximately correct for months of March, April, May, June, July, August, September for 30° North Latitude.

TABLE 4B-3
WALLSAVERAGE TEMPERATURE DIFFERENCE FOR ESTIMATING ANNUAL ENERGY USE
(CLDT)

(CLDT)

WALL GROUP	WALL DESCRIPTION	AVERAGE TEMPERATURE DIFFERENCE														AVERAGE TEMP. DIFF. SOLAR TIME 7-18								
		SOLAR TIME														NO LATITUDE WALL FACING								
		7	8	9	10	11	12	13	14	15	16	17	18	AV.	N	NE	E	SE	S	SW	W	NW	AV.	
A	<ul style="list-style-type: none">- 4" face brick, insulation or air space, + 8" Common Brick- 4" face brick, insulation or air space, + 8" block- 4" face brick, insulation and 8" Tile- 8" concrete wall + 2" insulation and finish- 12" concrete wall + 2" insulation and finish	19	19	17	18	16	16	16	16	16	17	18	18	17	11	16	21	19	15	19	20	16	17	
B	<ul style="list-style-type: none">- 4" face brick, 2" insulation + 4" common brick- 4" face brick + 8" common brick- 4" face brick, 2" insulation, + 4" concrete- 4" face brick, 2" insulation + 8" block- 4" face brick, air space or 1" insulation, + 8" tile- 8" concrete + 1" or 2" of insulation- 12" concrete- 8" clay tile + 2" insulation	16	15	14	13	14	14	14	15	16	17	18	20	15	10	16	20	18	13	16	17	13	15	
C	<ul style="list-style-type: none">- 4" face brick, air space, + 4" brick- 4" face brick, air space or 1" insulation + 4" common brick- 4" face brick, air space, + 2" concrete- 4" face brick, air space, or 1" insulation, + 6" or 8" block- 4" face brick, insulation, + 4" tile- 4" face brick, , + 8" tile- 2" insulation + 4" concrete- 8" concrete- 8" tile + air space and 1" insulation	13	12	12	12	12	14	14	16	18	20	22	24	15	9	16	22	20	14	14	15	12	15	
D	<ul style="list-style-type: none">- 4" face brick + 4" common brick- 4" face brick, air space or insulation, + 4" block- 4" face brick, + 8" block- 4" face brick, + 4" tile- 4" face brick, air space, + 4" tile- 4" concrete + 1" insulation- 8" concrete block, air space and insulation- 2" insulation + 4" clay tile- 8" tile	9	9	9	10	12	15	16	18	20	21	24	27	16	9	18	24	22	14	14	14	11	16	

TABLE 4B-3
WALLS

AVERAGE TEMPERATURE DIFFERENCE FOR ESTIMATING ANNUAL ENERGY USE
(CLDT)

WALL GROUP	WALL DESCRIPTION	AVERAGE TEMPERATURE DIFFERENCE														AVERAGE TEMP. DIFF. SOLAR TIME 7-18									
		SOLAR TIME														NO LATITUDE WALL FACING									
		7	8	9	10	11	12	13	14	15	16	17	18	AV.	N	NE	E	SE	S	SW	W	NW	AV.		
E	- 4" face brick + 4" block - 4" concrete - 2" insulation + 4" concrete block - 8" concrete block - 4" tile + 1" insulation	5	6	9	12	15	18	20	23	25	28	31	34	19	11	21	28	27	17	17	16	13	19		
F	- 4" concrete block + air space and insulation - 4" clay tile - 4" clay tile + air space	3	7	11	16	20	22	26	26	30	33	36	38	20	13	24	39	30	21	21	20	15	20		
G	Metal curtain wall with 1", 2" or 3" insulation Frame wall + 1" to 3" insulation	11	18	22	27	28	29	32	34	38	40	40	37	30	18	29	38	36	28	33	33	25	30		
	NOTES: If indoor temperature is other than 78°, adjust values by adding the difference obtained by subtracting indoor temperature from 78°. If average daily outdoor temperature is other than 85°, adjust values by adding the difference obtained by subtracting 85° from the outdoor temperature. For light colored walls multiply values by .65 Data extrapolated from 1977 ASHRAE Handbook & Fundamentals.																								

TABLE 4C-3
DIRECT SOLAR AND DIFFUSE SKY RADIATION

48° N. Latitude

FOR SINGLE COMMON GLASS

DATE	SUN TIME						AVERAGE 8:00 A.M. THRU 6:00 P.M.
	A. M.			P. M.			
	8:00	10:00	12:00	2:00	4:00	6:00	
Mar. 22 Sept.22	77	87	85	87	77	20	72
Apr. 20 Aug. 24	83	82	76	82	83	30	73
May 21 Jul.23	83	77	68	77	83	58	74
June 21	82	75	64	75	82	63	74
Average	81	81	75	81	81	40	73

HORIZONTAL GLASS

Mar. 22 Sept. 22	67	156	188	156	67	20	109
Apr. 20 Aug. 24	114	197	227	197	114	11	143
May 21 Jul. 23	142	219	247	219	142	39	168
June 21	152	225	252	225	152	51	176
Average	114	196	225	196	114	27	145

TABLE 4C-4
DIRECT SOLAR AND DIFFUSE SKY RADIATION

DATE	GLASS FACING							
	N	NE	E	SE	S	SW	W	NW
Mar. 22 Sept. 22	17	28	70	110	132	129	93	40
Apr. 20 Aug. 24	25	42	78	91	81	108	93	51
May 21 Jul. 23	31	46	78	90	78	101	103	67
June 21	34	48	78	85	70	97	104	72
Average	26	40	76	95	73	110	97	55

TABLE 4C-4
SHADING COEFFICIENTS AND "U" VALUES FOR GLASS

	TYPE GLASS	AVE. "U"	AVERAGE SHADING COEFFICIENT					
			NO. SHADE	VENETIAN BLINDS		DRAPERIES		
				Light	Med.	Light	Med.	Dark
Single	Single Layer Clear SS, Ds, 1/8 to 1/4	1.10	1.00	.55	.64	.56	.61	.72
	Single Layer - Blue-Green	1.10	.75	.53	.58	.48	.50	.58
	Single Layer Grey	1.10	.61	.47	.50	.41	.44	.48
	Single Layer Bronze	1.10	.67	.47	.52	.43	.46	.52
Double Glaze	Double Glaze Clear	.58	.83	.50	.55	.48	.52	.57
	Double Glaze Blue-Green	.58	.62	.40	.43	.41	.43	.46
	Double Glaze Grey	.58	.57	.37	.40	.39	.41	.45
	Double Glaze Bronze	.58	.63	.38	.43	.41	.44	.48
Single	1/4" Laminated Vari-Tran	1.05	.35	.26	.29	.27	.28	.30
	Monolithic Vari-Tran Clear	.85	.32	.24	.27	.25	.26	.27
	Monolithic Blue-Green	1.05	.57	.42	.48	.42	.44	.48
	Monolithic Grey Tuf-Flex	.95	.45	.33	.37	.33	.35	.40
	Monolithic Bronze Tuf-Flex	.95	.42	.32	.35	.32	.33	.35
Double	Double Glaze with Vari-Tran Clear	.50	.24	.22	.22	.21	.21	.22
	Double Glaze Vari-Tran Blue-Green	.55	.45	.38	.39	.36	.37	.40
	Double Glaze Vari-Tran Grey	.55	.33	.28	.30	.28	.29	.30
	Double Glaze Vari-Tran Bronze	.55	.31	.27	.27	.26	.26	.28

